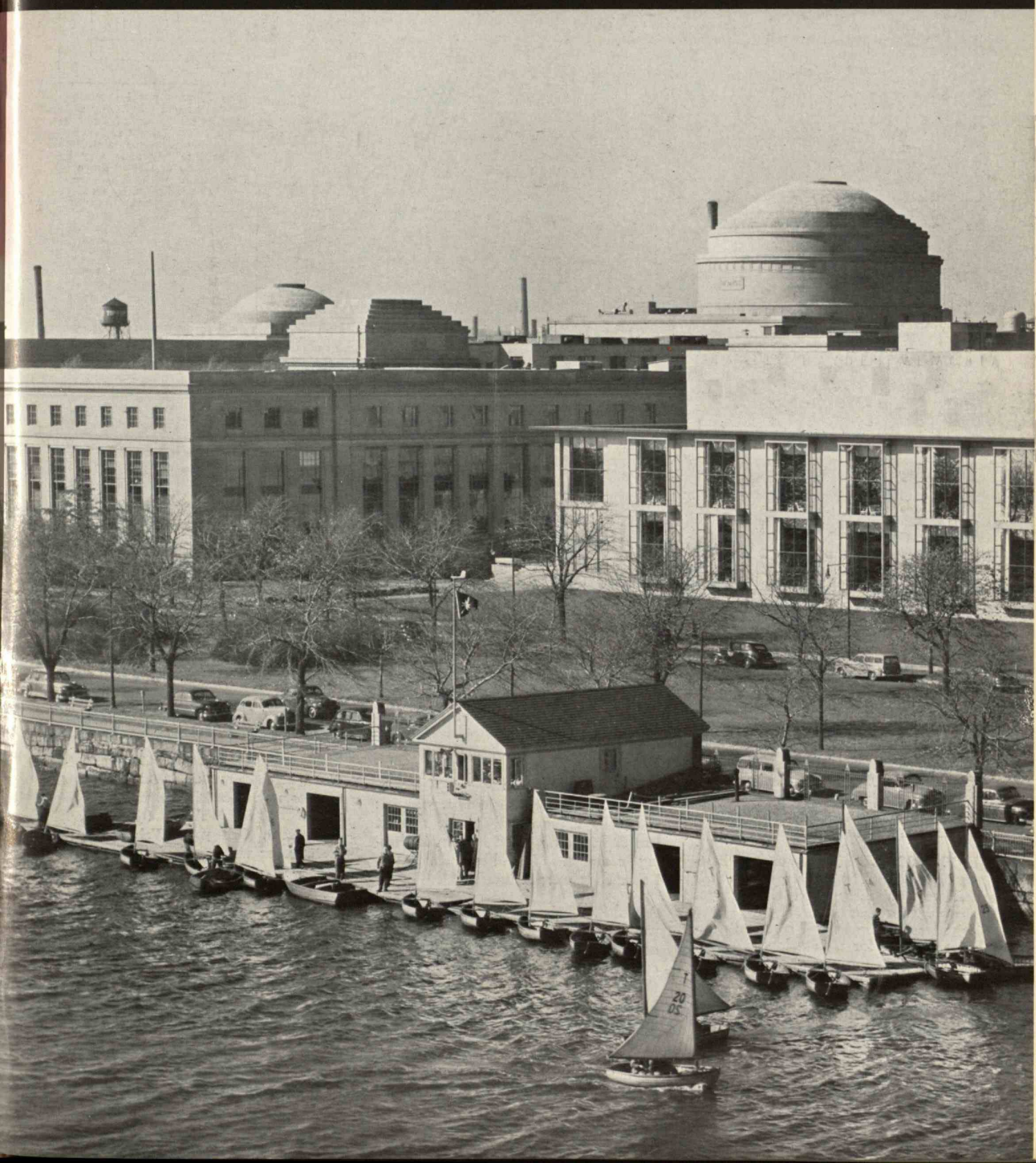


TECHNOLOGY

REVIEW

April 1952



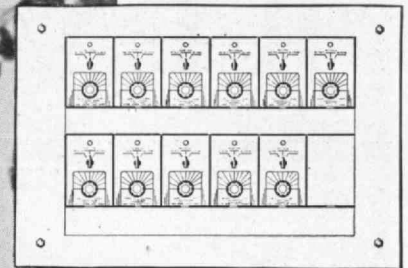
technology review

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The Travelers Insurance Co.
Buildings, Hartford, Conn.
Architects: Voorhees, Walker,
Foley & Smith, Consulting
Engineers: Meyer, Strong and
Jones, Heating Contractor:
Libby and Blinn, Inc.



This 11-zone panel centralizes control at one point. Any zone may be (a) shut off, (b) put on automatic or (c) put in heating-up position from this point. Rate of heat to any zone may be speeded up or slowed down in comparison with the normal supply as indicated by Outdoor Thermostat control.

Heating Modernization Program Pays The Travelers Insurance Company

The original home office building of The Travelers Insurance Company was built in 1906. As The Travelers grew, additional office space was provided by new buildings erected in 1912, 1918 (the Tower building), 1921 (the building in center foreground), 1926, 1928 (the large rectangular building at right), 1938 and 1939, bringing the total floor area occupied by the Company to 1,012,834 square feet.

In 1944, 38 years after the original heating installation, The Travelers asked their architects to recommend the changes necessary for modern heating with two objectives—minimum fuel cost and complete comfort for all employees.

After careful study, the following were approved: (1) four new oil-fired water-tube boilers with automatic combustion control, each boiler having a capacity of 25,000 lbs. of steam per hour, (2) a smaller water-tube boiler for heating domestic hot water in the summer months, new vacuum pumps and related

boiler-room equipment, (3) improvements to the existing ventilation system, (4) a Webster Moderator System of Steam Heating for "Controlled-by-the-Weather" economy.

By 1948, when the modernization program was completed, heating service was noticeably improved. Employee comfort was definitely improved as chronic heating complaints had been eliminated. Labor costs were reduced.

Actual fuel savings of approximately 40% were indicated by a comparison of heating costs between the operation of the old coal fired plant and heating system, and the new boiler plant along with the new Moderator controlled heating of the buildings.

Here is evidence that well-planned heating modernization programs pay big dividends in improved heating service and

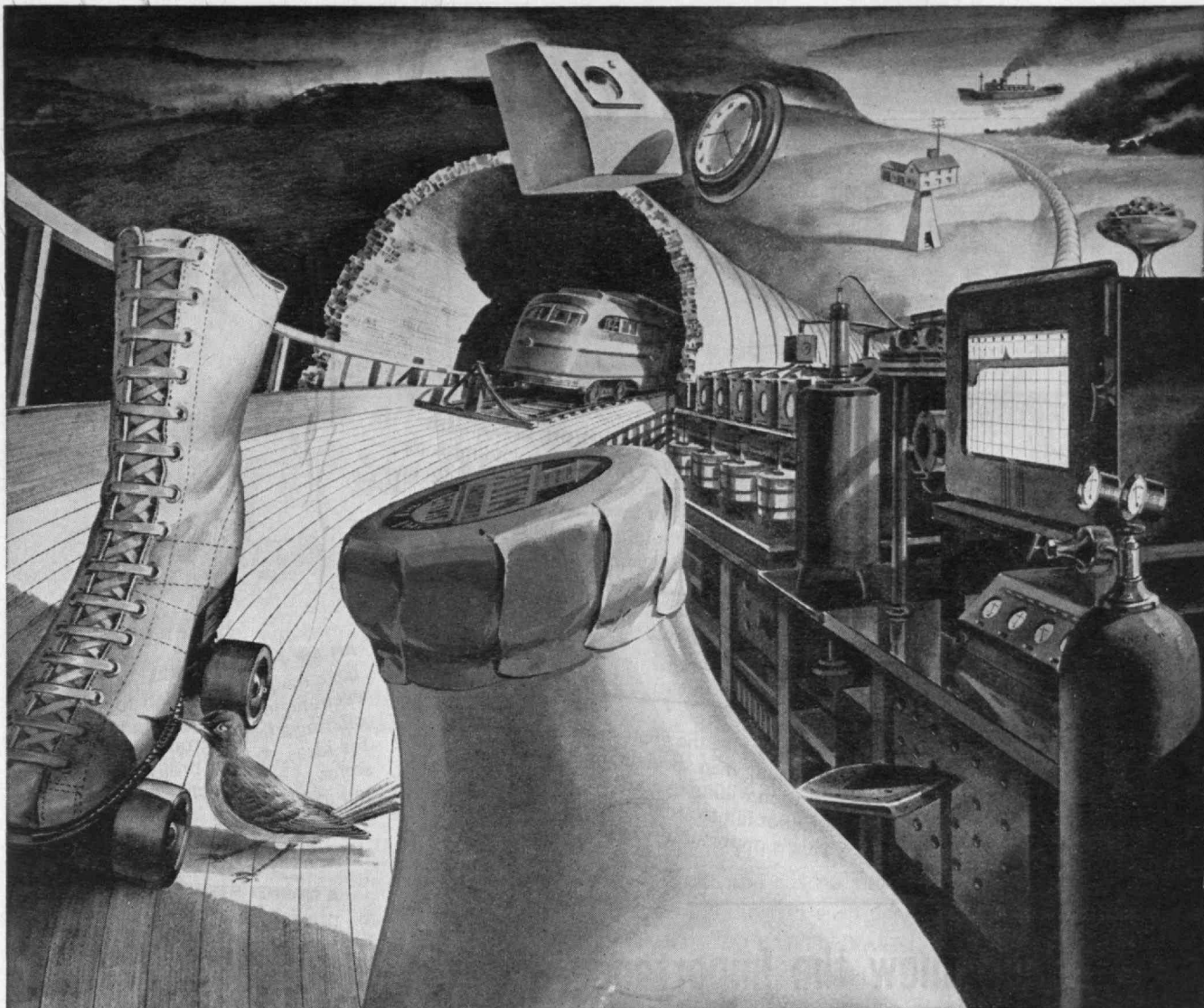
lower fuel costs. If you are planning the heating for a new building or modernization of an existing building, the Webster Moderator System belongs in your plans.

There are Webster representatives in 65 principal cities working with architects, engineers and heating contractors in the application of Webster Systems and Equipment. Call your Webster representative or write us for his name.

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Camden 5, N.J. Representatives in Principal Cities
In Canada, Darling Brothers, Limited, Montreal

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MODERATOR**
SYSTEM
OF STEAM HEATING
"Controlled-by-the weather"



All but one of the objects in this picture have something in common — Norton or Behr-Manning abrasive products are vital factors in their manufacture and in their quality. *Can you find the stranger?*

What doesn't belong in this picture?

The skating rink? No! The rink was machine sanded by Behr-Manning Resinized Speed-Grits Floor Sanding Paper. Roller skates, too, get smooth-running, long-wearing qualities from operations involving Behr-Manning and Norton abrasive products.

The research lab? No! ALUNDUM refractory laboratory ware in a variety of sizes and shapes is widely used in laboratory work for operations involving incineration, filtration and aeration.

The clock? No! Many of its parts are deburred and finished by means of Norton ALUNDUM Tumbling Abrasive.

The milk? No! Practically every piece of modern dairy equipment depends on Norton and Behr-Manning products for its manufacture and maintenance.

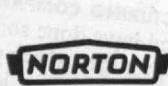
The street car, the washing machine, the bon-bon dish also owe a large part of their existence to Norton and Behr-Manning products used during manufacture.

The stranger in the picture is the robin. Any man-made product — whether of metal, wood, paper, cloth, leather, ceramics, plastics — depends in some important way on products that bear such well-known trademarks as Norton and Behr-Manning.

Norton Company makes abrasives, grinding wheels, refractories, Norbide grain and molded products, grinding and lapping machines, non-slip floors. Norton Company, Main Office and Works, Worcester 6, Massachusetts.

Behr-Manning makes abrasive paper and cloth, oilstones, abrasive specialties, Behr-Cat brand pressure-sensitive tapes. Behr-Manning Corporation, Division of Norton Company, Troy, New York.

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Have You Taken This Opportunity for

COLONEL, RESEARCH AND DEVELOPMENT DIVISION, DEPARTMENT OF THE ARMY: "Full support should be given any sound measure designed to encourage inventors and facilitate consideration and further development of their ideas or inventions. It is difficult to conceive of any action that would accomplish more in this direction than that called for in the Sinclair Plan."

CABINET MEMBER: "It should bring to light some valuable ideas which might otherwise not have been known."

AN INVESTMENT COUNSELOR: "I can imagine the great surge of hope now going through the breasts of the young men specializing in this field. 'Here,' they will say, 'is a corporation willing to give us a break.' . . . Its fundamental unselfishness cannot fail to strengthen the faith of those without property. . . . This is opportunity!"

AN AIR FORCE GENERAL: "I have read of your plan for encouraging invention and offering a testing ground for ideas. Such a project seems to me both practical and inspirational!"

Men Who Know the Importance of Independent Invention Encourage You to Use the Sinclair Plan

A MEMBER OF THE JOINT CHIEFS OF STAFF: "The Sinclair Oil Corporation is performing another fine public service in opening its research laboratories to the American inventor. I am confident that the nation will derive many benefits from this selfless service."

A CABINET MEMBER: "The provisions regarding patents are unique . . . the compensation for your investment of money, time, and facilities would be limited to nonexclusive, royalty-free shop rights for your company."

PRESIDENT OF A BROADCASTING NETWORK: "To make the magnificent facilities of the Sinclair Research Laboratories available to inventive Americans under what would seem to be a very fair arrangement is a constructive and forward-looking step."

PRESIDENT OF LARGE MANUFACTURING CORPORATION: "We all think the plan, which opens wide the doors of your great research laboratories, should indeed encourage individual inventors."

AN AIR FORCE GENERAL: "I wholeheartedly agree that there is a need to help the independent inventor because of the complexity of modern technology and the prohibitive cost of these facilities. Your farsighted plan is a great stride in relieving this situation."

PRESIDENT OF A LARGE MANUFACTURING COMPANY: "You have recognized a great need, and have done something objective to overcome it . . . another idea which puts to beneficial use the resources and capacity of a large group."

Advantage of Independent Inventors?

*If you have an idea for a new petroleum product—
but do not have the facilities needed to develop it—
the Sinclair Plan offers you laboratory help.*

EIGHT months ago, Sinclair opened up a part of its great research laboratories to independent inventors who had ideas for new or improved petroleum products but who did not have the facilities needed to develop and profit by their ideas.

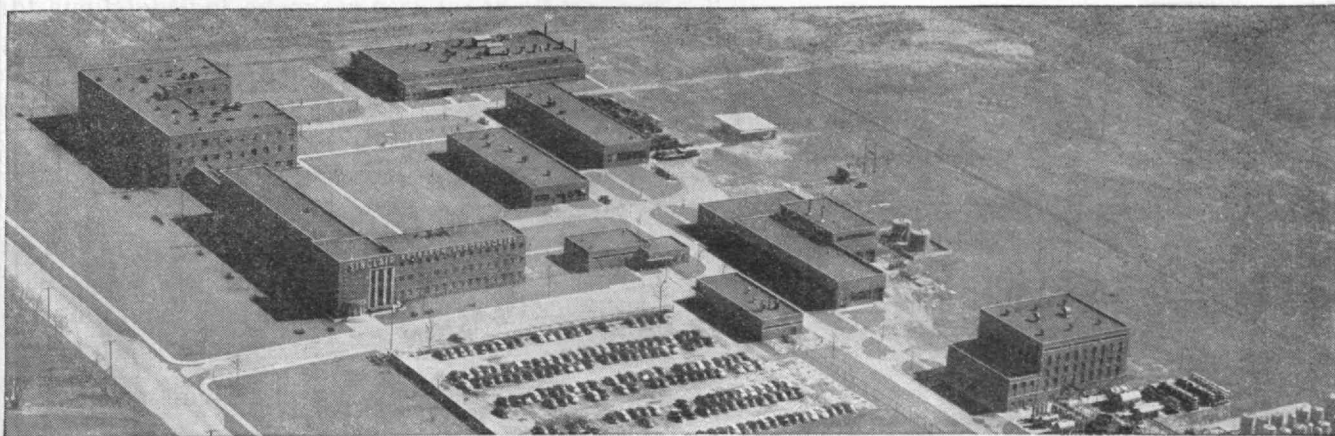
To date nearly 5,000 inventive people have submitted ideas to the laboratories; and the Sinclair Plan has become recognized as a service to inventors, the oil industry and the public. As a result we have made the Plan part and parcel of the long-range operation of our company.

If you have an idea for a new or improved petroleum product or application, you are invited to submit it to the Sinclair Research Laboratories. In your own interest, each idea must first be protected by a patent application or a patent.

If the laboratories select your idea for development, they will make a very simple arrangement with you: In return for the laboratories' work, Sinclair will receive the privilege of using the idea for its own companies, free from royalties. This in no way hinders the inventor from selling his idea to any of the hundreds of other oil companies for whatever he can get. Sinclair has no control over the inventor's sale of his idea to others, and has no participation in any of the inventor's profits through such dealings.

HOW TO PARTICIPATE: Instructions are contained in an Inventor's Booklet. Write to W. M. Flowers, Executive Vice-President, Sinclair Research Laboratories, Inc., 600 Fifth Avenue, New York 20, N. Y.

IMPORTANT: *Please do not send in any ideas until you have sent for and received the instructions.*



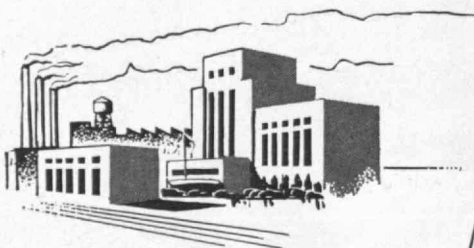
Nine buildings of the Sinclair Research Laboratories at Harvey, Ill.

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Operation of this new producing unit marks another major step in the Cabot program to assure the constant availability of adequate supplies of all types of carbon black essential to industry. The Cabot Companies are now producing SRF black at Guymon, Oklahoma; Pampa, Texas; and Ville Platte, Louisiana. This new plant, located on the Gulf Intracoastal Waterway, and on the Texas and New Orleans branch of the Southern Pacific Railroad, is fourth in a series of SRF plants independently established to accomplish our objective. Each plant is a separate source of supply of the same, uniform high quality SRF black, and employs the use of different truck and railroad services.

These additional facilities will insure further customer protection against production curtailments of every kind, making possible even better Cabot service.



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Carbon Blacks Opens
Another New Plant**

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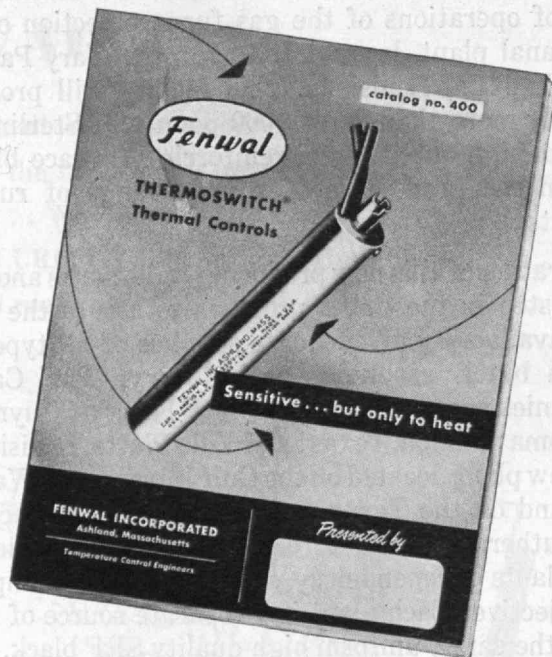
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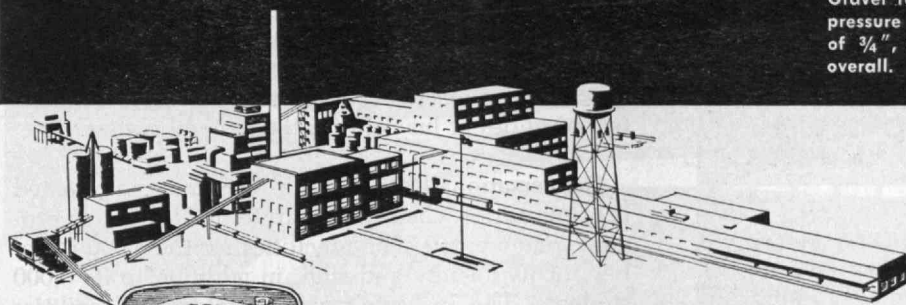
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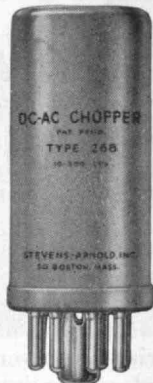
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THE TABULAR VIEW

Co-operative Effort. — The beneficial effects of science cannot be maximized through science alone. The co-operation of many others is needed for this achievement as PROFESSOR THOMAS K. SHERWOOD, '24, Dean of Engineering at the Institute, reminds us in his article (page 295), first given at the symposium on "Frontiers in Science" at the alumni meeting in Los Angeles on January 26. Dean Sherwood received the bachelor of science degree from McGill University in 1923. From M.I.T. he received the S.M. and Sc.D. degrees in 1924 and 1929, respectively. From 1928 to 1930 he was assistant professor of chemical engineering at Worcester Polytechnic Institute. He returned to M.I.T. in 1930 and since 1946 has been dean of engineering at the Institute.

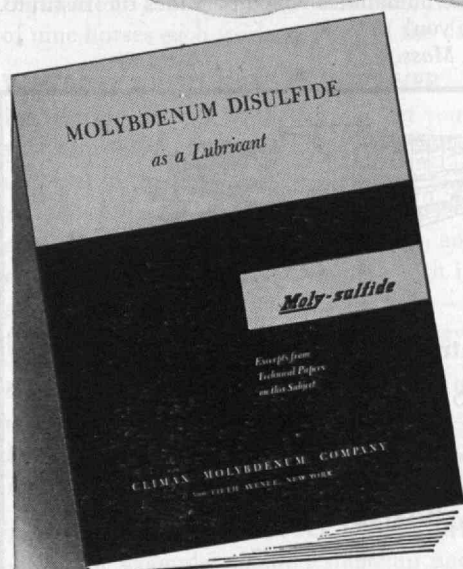
Sound Design. — Since the end of World War II, interest in high-quality audio-reproducing systems for the home has increased by leaps and bounds, as is recounted (page 297) by C. J. LeBEL, '26. Mr. LeBel received the S.B. and S.M. degrees from the Institute in 1927. In 1937 he became chief engineer of Audio Devices, Inc., and is now vice-president of this firm which is the largest producer of lacquer-recording blanks. Mr. LeBel is also chief engineer of Audio Instrument Company, Inc., which firm has pioneered in a number of new electronic instruments. In presenting "Audio Engineering Comes into the Home" Mr. LeBel has been primarily concerned with removing the technicalities of his field for the general reader.

Conversationally Speaking. — Some unexpected problems arise when the Institute undertakes to provide adequate telephone facilities for the 5,000 members of its Faculty and staff, in addition to its 5,000 students. The Institute's present telephone facilities are described (page 302) by PROFESSOR CARLTON E. TUCKER, '18, who planned the present installation with Bell System engineers. Since receiving the S.B. degree from the Institute in 1918, Professor Tucker has spent his entire professional career at Technology. During World War II he was appointed executive officer for the Department of Electrical Engineering, and also directed the M.I.T. Radar School which trained many officers for the armed services.

Dollars and Sense. — With both practical and theoretical understanding of the field, PROFESSOR RALPH E. FREEMAN, Head of the Department of Economics and Social Science, writes with unusual understanding of the Institute's aim in offering courses in economics (page 304). Professor Freeman is a graduate of McMaster University in Canada and winner of a Rhodes Scholarship. He carried on graduate studies at Balliol College, Oxford, and spent two years at the University of Chicago where he was awarded a fellowship in the Department of Economics. He became associate professor of economics at M.I.T. in 1931 and head of the Department of Economics and Social Science in 1933.

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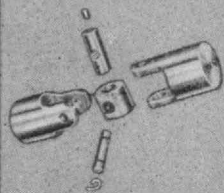
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MAIL RETURNS

Allegiance Shared

FROM E. H. CAMERON, '13:

As a proud member of the fifth class to graduate from the Lowell Institute School for Industrial Foremen, in 1909, may I express my appreciation of the splendid article in the December, 1951, issue of *The Review* by Arthur L. Townsend on "The Lowell Institute School."

Like all youngsters, I took for granted the fact that some good person had made possible this fine education at practically no cost at all. Professor Townsend's article gives the historical background of the century-old Lowell Trust, from which the Foremen's School stems. It shows how a man, over 100 years ago, recognized the determined urge of most young men to get an education, and who was wise enough to write a will that has met the needs of such men.

There exists a mutual advantage between M.I.T. and Lowell Institute in this matter. Townsend's article tells how the Lowell Trust played an important part in the establishment of M.I.T. The concomitant obligation of Lowell to M.I.T. is that, consistent with the spirit of the will, M.I.T.'s laboratories and staff are available to Lowell students.

Superior administrative talent has been necessary to carry on the Lowell project with such mutual advantage to both institutions. The greatest beneficiary, of course, is the Lowell student body. They are screened men, who are getting their education the hard way, and who will continue to study. Some continued their education by matriculating at M.I.T. after graduating from Lowell. Statistics would be interesting stating the number of men who are graduates of both Lowell and M.I.T.

Boston, Mass.

In Step

FROM DR. EGON E. KATTWINKEL, '23:

May I compliment you on the January, 1952, number of *The Review*. The photography is unusually interesting with reproductions excellent. For some years now I have been increasingly proud to place the issues on my waiting room magazine table. The *Review* is right in step with the new spirit of the humanities which pervades the Institute. More power to you!

West Newton, Mass.

BEFORE PRODUCTION . . .

Gear design for industry or functioning device can foretell profit or loss.

Before production plans go too far—be sure you know what you can save by buying gears especially engineered for your exacting needs.

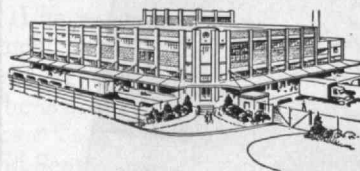
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WHERE DO YOU GET SUCH POWER—Merely by flicking a switch . . . for by that simple act you are tapping the vast sources of electric energy that are ready to work for all of us in the home and on the job.

Today, the use of electric power has grown to where a single factory uses more electricity than an entire city used a generation ago. And your home—with its electric appliances, lighting and other conveniences—consumes more power than was used in yesterday's factory.

NEW MATERIALS WERE NEEDED—This great progress could not have been achieved without the many new and better materials which make possible today's larger and more efficient power generating equipment.

A JOB FOR ALLOY STEEL—Giant turbines and generators, for example, couldn't stand up under terrific heat,

pressure, wear and corrosion if it weren't for steels made tough and enduring by alloying metals.

Improved plastics also do their part in better insulation and protective coatings. And carbon brushes are as vital to huge generators as they are to your vacuum cleaner motor.

FOR MORE POWER—Developing and producing alloys, plastics, carbons and many other better materials for our power industry are but a few of the many ways in which the people of Union Carbide serve all of us.

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Learn more about the many fields in which Union Carbide offers career opportunities. Write for the free illustrated booklet "Products and Processes" which describes the various activities of UCC in the fields of ALLOYS, CARBONS, CHEMICALS, GASES, and PLASTICS. Ask for booklet A-2.



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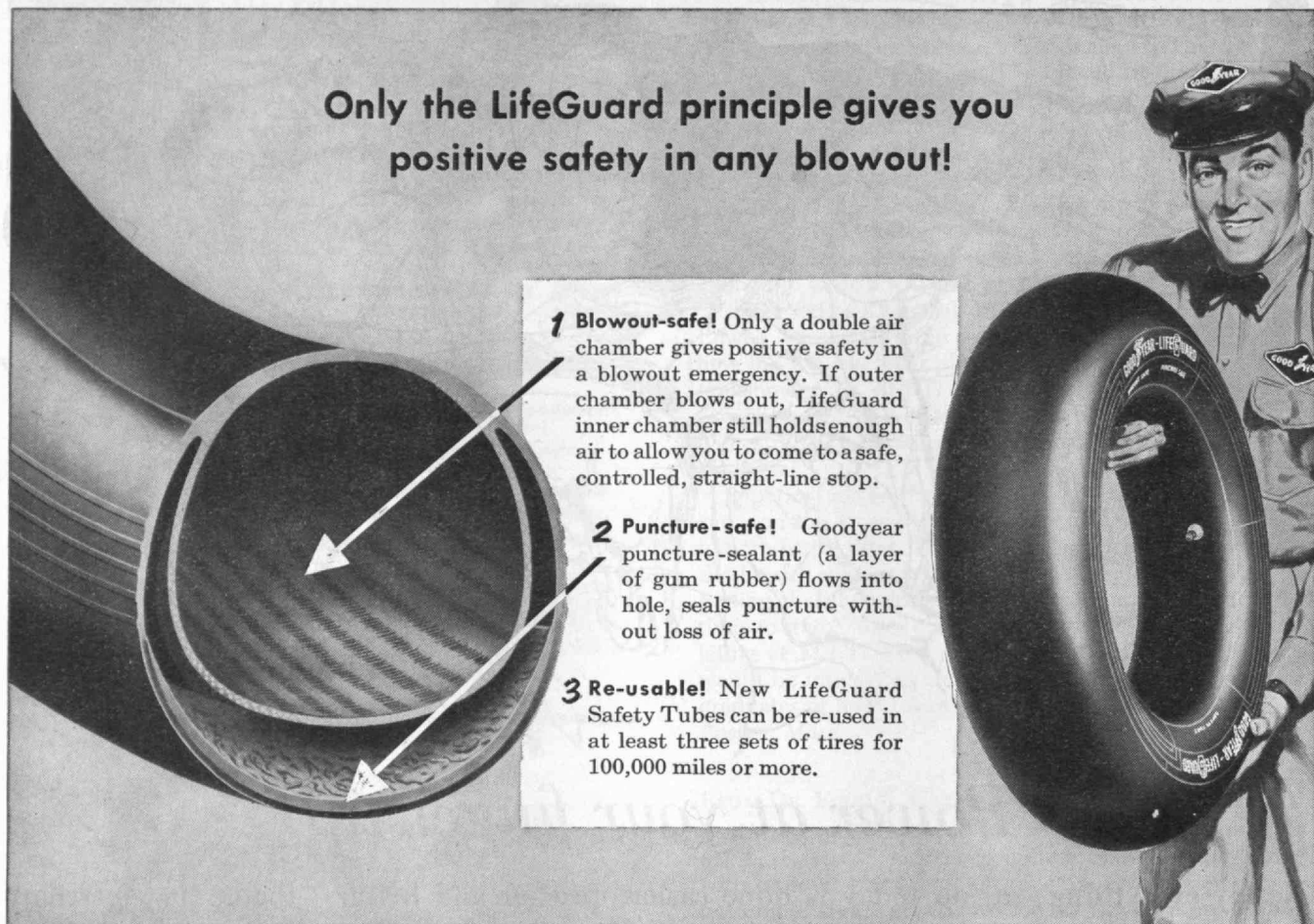
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You save 20% to 43% per wheel!

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See your Goodyear dealer today! Get

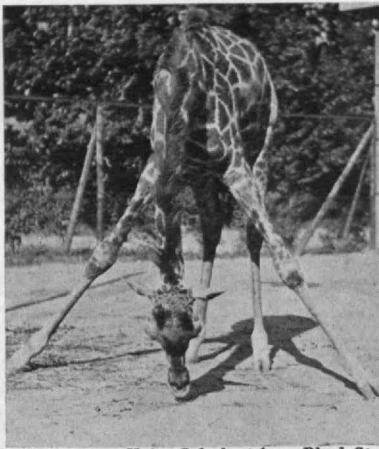
the complete story of re-usable blowout and puncture protection. The kind of practical protection every motorist can afford!

Only multi-million-mile proved protection! In 17 years, in millions of miles, we know of no case of failure of the LifeGuard principle in a blowout.

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decimal point in Structures."

THE TECHNOLOGY REVIEW

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Raymond E. Hanson

*By the rude bridge that arched the flood,
Their flag to April's breeze unfurled,
Here once the embattled farmers stood,
And fired the shot heard round the world.*

— Ralph Waldo Emerson

THE TECHNOLOGY REVIEW

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April, 1952

The Trend of Affairs

What's New in Electronics

WHAT was probably one of the largest assemblages of engineering talent on record gathered in New York City on March 3 to 6, inclusive, for the annual national convention of the Institute of Radio Engineers. In celebration of its 40th anniversary, the I.R.E. presented a technical program of well over 200 engineering papers at the Waldorf Astoria Hotel, with overflow symposia at the Belmont Plaza Hotel. In addition to the technical program, the four floors of the Grand Central Palace were crowded to capacity with exhibits of equipment for the electronics field. The 29,500 engineers who were registered for the four-day event were also subjected to a highly active, employment-solicitation campaign by firms who had — or hoped to get — their share of orders in today's research and development program which, for the current year, is expected to cost three billion dollars.

Many of the symposia and discussion groups dealt with progress in electronic instruments, radio antennas, transmitters and receivers, television, and electric circuits as would be expected in meetings of radio engineers. But, perhaps one fifth to one quarter of the technical papers were devoted to topics which, a decade back, would have been regarded as lying outside the normal sphere of activities for radio engineers. Such is the case, for example, with the meetings which were devoted to transistors, feedback control, information theory, medical electronics, telemetering, digital computers, magnetic core memory devices, and circuits employing ferroelectric and ferromagnetic materials.

Having its initial stimulus in the groundwork laid during World War II by Professor Norbert Wiener of the Department of Mathematics and his associates at Technology, information theory is basically rather mathematical. Its principles cannot be easily or quickly interpreted in layman's terms, although progress in this field brings to light engineering applications which all can appreciate. Because of recent

progress in this field, it is possible to produce communication systems which are freer from noise interference than formerly. Moreover, physical facilities (such as wire lines or radio channels) can now be used much more effectively than in the past. By extending the amount of useful information which can be transmitted over given physical facilities, we may look forward to improvements in the performance of communication systems, or possibly, to reduction in cost of services of specified quality.

New fields of engineering application are rapidly being developed as an outgrowth of fundamental studies in physics of the solid state. Devices employing semiconductors, or the ferroelectric or ferromagnetic properties of materials, are especially promising. Unique nonmetallic materials, called ferrites, exhibit new combinations of magnetic, conducting, and dielectric properties whose intriguing possibilities are just now being investigated. With piezoelectric properties and high dielectric constants, another group of materials, called titanates, have been employed as compact electric-circuit elements in air-borne equipment, or as mechanisms for converting electric energy to mechanical energy and vice versa. Amplifiers and oscillators of unusual types and new kinds of memory and switching circuits have already been devised (or may soon be expected to appear) as properties of ferroelectric and ferromagnetic materials are intelligently applied. In the field of semiconductors, perhaps the outstanding development is the transistor whose versatility, compactness, ruggedness, long life, and low-power consumption threaten the ordinary electron tube with serious competition in a wide range of applications.

Already, rapid progress has been made in electronics through development of new materials having specified arrangement of atoms and molecules. In our contemporary technology, it should be but a small step for the design engineer of the future to obtain, on specification, materials with the required physical, chemical, metallurgical, electrical, piezoelectric, and magnetic properties. In the reasonably

near future, there may be an important field of employment for those scientists and engineers who are able to shape the elements into compounds of desired properties. The fact that William Shockley, '36, was awarded the Morris Liebman Memorial Prize by the I.R.E. for his contributions to the creation and development of the transistor is a straw in the wind. But, universities may find it desirable to still further promote progress of this kind, through establishment of courses of instruction for the training of others who can design materials — as well as products — for specified requirements.

One entire symposium was devoted to a discussion of problems of management of research and development which has now reached the proportions of "big business." The country will spend almost three billion dollars in research and development of discoveries during 1952. Of this amount, about \$1,750,000,000, or more than half, will be spent by the government, whereas the remaining \$1,250,000,000 will be spent by all other sources, including universities, foundations, and industry. With a good part of government-sponsored research cloaked in secrecy, the possibility for duplication of effort — with its consequent waste of critical man power, materials, and money — came in for comment by W. R. G. Baker, Vice-president and general manager of the Electronics Division of the General Electric Company. Dr. Baker, who was the recipient of the I.R.E. Medal of Honor this year, pointed out that many persons are alarmed at the extent to which government now participates in research and development. He called for a "whole-hearted investigation to determine the over-all efficiency and the extent of duplication of governmental research and development" and urged that engineers from industry and educational institutions be selected to make such an investigation.

Certainly the radio industry would be hard hit if government-sponsored research in the electronics field were to be withdrawn. With the cost of electronic equipment alone in some new jet bombers costing more than the entire cost of two heavy bombers of World War II, and with the demand for technically trained personnel in the electronics field at fantastic heights, there are ample surface indications of prosperity. But one Technology Alumnus who is, himself, trying to employ technically trained personnel, took a peek under the frosting. It was his conclusion that engineers who wish to make a career in electronics be triply careful in any changes of affiliation they make under current conditions.

Constitution of Coal

THE formation of coal has generally been thought to take place in two distinct stages. In the first or biochemical phase, certain plant components are degraded and concentrated to produce the humic substances of peat or lignite. In the dynamochemical or metamorphic stage, the components of the low-grade coals are devolatilized to produce fuels having higher percentages of fixed carbon. Following the second phase of coalification, the original humic components have lost their identity and, therefore, it has been difficult to relate by chemical means the structure of the

organic substances in the coal to that of the original plant components, such as lignin or cellulose. Since coal will undoubtedly gain increasing importance as a chemical raw material in the coming years, studies were undertaken in the Department of Geology in the fall of 1947 to obtain information on the basic chemical structure of most coals. The studies are sponsored by the Nova Scotia Research Foundation.

The relative contribution of cellulose and lignin to coal has long been a controversial subject. In order to consider the problem properly, a very thorough survey of the available chemical data was carried out from which it was possible to infer, on a theoretical basis, that lignin is probably the major source of humic substances and of coal, while, for the most part, cellulose is biochemically degraded and decomposed. In initial experimental studies, it was found that the infrared spectrum of lignin, isolated from wood, resembles very closely that obtained from humic acid isolated from peat. Further studies, carried out in Holland during 1951 by Irving A. Breger, '47, research associate on a Fulbright Fellowship, made use of the piles exposed when the city of Rotterdam was destroyed by bombing. These studies confirm the fact that cellulose is decomposed under burial conditions in which free oxygen is absent, and that while the lignin undergoes relative concentration, it is also converted into humic substances. Hence, there can be little doubt that lignin is the major contributor to most coals.

Further evidence in favor of the origin of coal from lignin has been obtained by vacuum differential thermal analysis, a technique developed during this research. While the structure of coal is so complex that relatively little information can be derived from chemical degradation studies, the method of thermal analysis provides data on changes which take place in coal while it is being heated under vacuum and at a constant rate up to about 1,000 degrees C. The information so obtained has shown clearly that the thermal records of decomposition of lignin and cellulose differ markedly, and that the thermograms of most coals, especially those of lower rank such as lignite, resemble closely that of lignin. By means of this technique, it has been possible to show how the structure of lignin appears in humic acid and then becomes less pronounced as coals of higher rank are examined. This seems to indicate that the basic structure of lignin is more highly polymerized and condensed with higher rank of the coal until anthracite is reached. At this point of polymerization and condensation, it is difficult to detect the fundamental structure of lignin in the coal. Preliminary experimental studies have shown that high pressure shear forces may be responsible in part for the conversion and devolatilization of humic substances into coals of higher rank.

Comparison of the temperatures, at which peaks on the thermographic record of constituents of coal derived from wood attain a maximum, gives a measure of the relative rank of the coals — that is, the higher the temperature at which the maximum of the peak occurs, the higher the rank. Studies have also been made of the thermographic characteristics of the constituents in coals, such as spores, resins, and fusain or mineral charcoal.

How to Pump an Oil Well

MORE than 100 years ago, the Englishman Charles Babbage set to work on a digital calculating machine that was to be capable of solving complicated mathematical problems numerically without need for any human intervention from the time the solution was started until the result was produced. Relying on strictly mechanical devices, and encountering considerable difficulty in obtaining the financial support required, Babbage failed in his attempt. His ideas lay dormant for many years.

Today the situation has changed. The availability of reliable electron tubes, supplemented by extensive facilities and techniques in the field of instrumentation, has removed the technical limitations which Babbage faced. The greatly increased need for rapid computation in the technological problems confronting us today has justified expenditures for general purpose digital computing machines such as the Whirlwind computer recently completed by the Digital Computer Laboratory at Technology. Work on the computer, which contains some specially designed memory tubes developed at M.I.T., was begun five years ago under the sponsorship of the Office of Naval Research. Recent sponsorship has been jointly shared with the Air Force, which is applying the Whirlwind computer to certain problems of air defense.

Whirlwind is also being employed in a variety of extensive computations on unclassified research projects as well. One of the problems, which has been under investigation at the Digital Computer Laboratory, concerns the production of oil from an underground reservoir. Work on this project is being supported by M.I.T., and the members of the Institute's staff who are working on the problem are collaborating with members of research staffs of various oil companies. The problem consists of calculating, on the basis of very incomplete information, enough about the expected behavior of an oil reservoir to permit the selection of a schedule of oil production to produce as much total oil as possible at an economically feasible rate. Ideally, oil should be pumped from a reservoir as slowly as possible in order to avoid leaving oil trapped underground, but the slower oil is pumped, the less profitable becomes the operation. Obtaining information on which to base an intelligent compromise obviously has very important implications to the effective utilization of the natural resources of the United States.

Even if the structure of underground oil reservoirs were completely known, which it certainly is not, the problem would be of considerable numerical difficulty. Unfortunately, the structure of various reservoirs varies widely and is not easily determined, even crudely, in any given case. A complete analysis is not available at M.I.T., nor elsewhere so far as is known, but significant progress is being made, even though the end result is not yet apparent.

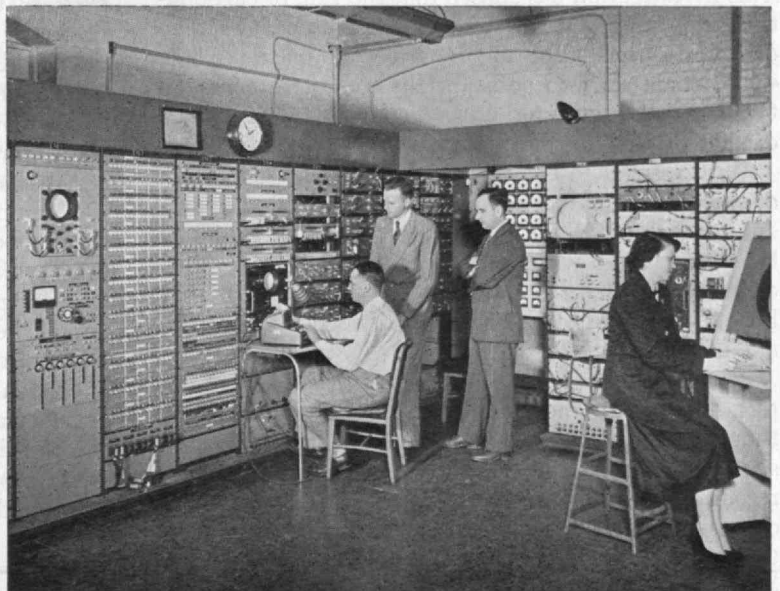
An interesting problem being considered at the Digital Computer Laboratory deals with another important natural resource: the allocation of part of the radio-frequency spectrum to the new ultra-high frequency television channels. This problem has been programmed for the Whirlwind computer, but even the extremely high speed of the computer is not sufficient to make a complete answer readily available in a cut-and-try problem requiring some 10^{68} trials for the New England states alone.

An extensive academic program in numerical computation is being built up at M.I.T. Some parts of this are being handled by persons affiliated with the Digital Computer Laboratory. For example, a new graduate subject, a second-term continuation of a more general study of digital computers, is being offered in which the computer serves as a laboratory tool for potential users of such facilities. A special Summer Session program in Digital Computers and Their Applications will be offered next July by Charles W. Adams, instructor in Electrical Engineering, and Jay W. Forrester, 6-45, Director of the Digital Computer Laboratory. Extensive use will be made of the Whirlwind computer as a demonstration and practice device.

The extremely high speed of the Whirlwind computer makes possible the study of such systems as the control of air traffic into an airport. Such control applications lead to studies of the effects of the discrete sampling of continuous data on the operation of a control system and studies of the use of digital computers as data filters. A new graduate subject is planned by William K. Linvill, 6-45, Assistant Professor of Electrical Engineering, in which the problems of sampled-data systems will be analyzed for the benefit of students interested in this new field.

The recently organized Committee on Machine Methods of Computation serves as a clearing house for the computational problems of M.I.T. staff, graduate students, and others.

While engaged in research problems involving extensive computation, Whirlwind computer, a portion of which is shown below, enhances the educational program at M.I.T.



Chemistry of Plaster

As might be inferred from the name, finish, or white coat plaster is used for finishing walls. When properly applied, the smooth, white surface may be painted, papered, or left undecorated. Although generally a satisfactory construction material, finish plaster is not without certain defects whose elimination is a desirable objective.

Over the past 20 years, several investigators have undertaken studies of white coat plaster to improve its properties. Most of these investigations have been made primarily with the intent of explaining plaster failures, and with the aim of settling the highly controversial issue of whether or not the failures may be due to the resultant expansion which occurs when hydration converts magnesium oxide to magnesium hydroxide after white coat plaster is applied on the walls.

During the past two years, an investigation of white coat plaster has been under way in the Building Materials Research Laboratory at M.I.T. Under the direction of James A. Murray, Associate Professor of Materials, this investigation has been directed at learning the nature of the chemical changes occurring in plaster as time progresses.

White coat plasters, prepared from 16 commercial hydrated limes, have been aged under controlled conditions for more than two years: At various ages, these have been analyzed by differential thermal analysis. Significant differences have been found between the several white coats, particularly with regard to such factors as the rate of carbonation of the $\text{Ca}(\text{OH})_2$ portion, the rate of hydration of the MgO portion, and the retention of free and/or adsorbed water.

Upon exposure of the white coat to normal atmospheric conditions, the rate of carbonation of the $\text{Ca}(\text{OH})_2$ portion is of particular interest. Free $\text{Ca}(\text{OH})_2$ is known to be a deleterious substance when in contact with paint films or wallpaper because of its saponifying and bleaching action. For this reason, a freshly plastered wall should not be painted or papered until the $\text{Ca}(\text{OH})_2$ has substantially been converted by atmospheric CO_2 to calcium carbonate. This investigation has shown that the rate of carbonation is primarily a function of the commercial type or brand of lime used in preparing the plaster. Some white coats showed substantially complete carbonation in as short a period as seven days, whereas others did not attain this degree of carbonation in a year.

With respect to the hydration of the MgO portion of the plasters, it has been found that here too a variance is exhibited between different limes. Some of the limes used were apparently more active than others although, in general, it may be stated that very little, if any, hydration of the MgO occurred up to an age of one year.

Thermal analysis data have shown that some plasters hold water more tenaciously than others even though all the plasters studied were stored under the same conditions of temperature and humidity. This retention of water can be an important factor since a certain amount of moisture is necessary to bring about the reaction between $\text{Ca}(\text{OH})_2$ and CO_2 and thus has a bearing on the rate of carbonation.

Diffusion of Gases

THE energy of interaction between two molecules varies with the separation distance between them. At very close distances the molecules repel each other, but at larger distances they attract. For separation distances of the order of molecular dimensions, quantitative information concerning these interactions permits correlation and prediction of many properties of gases, liquids, and solids. Among these properties are viscosity, heat conduction, diffusion, thermal expansion, compressibility, lattice spacing, and heats of transition. Conversely, a study of these properties as a function of temperature helps provide desired information about molecular interactions.

In the Department of Chemistry, Isadore Amdur, Professor of Physical Chemistry, and his associates, have undertaken a series of diffusion studies to obtain such information for systems of like, as well as of unlike, molecules. Another purpose of these studies is to check the theoretical treatment of gaseous transport properties developed independently in 1917 by David Enskog and Sydney Chapman, the outstanding contributors in this field.

The availability of radioactive tracers has greatly facilitated these investigations by providing a relatively simple method for continuously following the rate of diffusion. In principle, the apparatus consists of a long brass tube with a center slide which can divide the tube into two gas-tight sections. With the slide closed, one section is filled with a gas, a small fraction of whose molecules contain radioactive atoms, the other section contains gas at the same pressure, but free of radioactive tracers. The slide is then opened and the diffusion is followed by measuring the saturation ionization current collected by internal coaxial electrodes in the two sections of the cell. The currents, of the order of 10^{-11} ampere, are measured with a specially designed, null type, direct-current amplifier which is capable of detecting currents as low as 10^{-15} ampere.

To date, investigations have been completed of the "self-diffusion" of CO_2 and of the mutual diffusion of CO_2 and N_2O between temperatures of -78 degrees C. and 90 degrees C., using C^{14}O_2 as the tracer. It had been assumed previously that the mutual diffusion coefficient for the isostere system,* $\text{CO}_2\text{-N}_2\text{O}$, would be the same as the self-diffusion coefficient for CO_2 . The present results, however, show that the diffusion coefficient for $\text{CO}_2\text{-N}_2\text{O}$ exceeds that for $\text{CO}_2\text{-CO}_2$ by about 2.5 per cent over the complete range. Expressions were obtained for the molecular interaction energies for the two systems which showed that, for work of high accuracy, it is not possible to assume that the energy of interaction between isostere molecules is the same as that between either pair of like molecules.

Current research on gaseous diffusion using radioactive tracers is concerned with measurements of the self-diffusion of CO , the mutual diffusion of the isostere system, CO-N_2 , and the effect of composition on the mutual diffusion of the system A-Xe .

* Isosteres may be defined as molecules which have the same mass and electronic structure.

New Frontiers in Science

Through Co-operation of Diversified Groups, a System for Utilizing the Findings of Science Has Been Developed Which Brings Benefits to Man at an Accelerated Pace

By THOMAS K. SHERWOOD

IN the mind of the ordinary person, the most important thing about science is that it has provided the basis for the great technological developments of "better things for better living." It is well to recall, however, that the influence of science on society has been considerably more profound than the material benefits for which we give it credit.

Two great wars in this century have resulted in the death of nearly as many people as there are in this country; a total perhaps twice as great as all the war deaths of the preceding 1900 years of the Christian Era. Yet the expectancy of life at birth has steadily increased with the years and done so at an increasing tempo. Even in the dark days of 1940-41 in Britain, the death rate actually declined below that of peacetimes. In the days of the great Roman Empire, the Romans lived an average of 22 years. When the author was born his life expectancy was 49, but the new-born child today can expect to live 68 years. More years have been added to man's lifetime in the last half century than during the preceding 1,000 years.

The impressive results of the medical sciences, and the supporting industrial technology are well illustrated by these statistics on life expectancy. But equally impressive are the increase in living standards and the reduction in the hard labor required for living. Slavery in the British Empire was not abolished until 1834 and, in the United States, its abolition occurred less than a century ago. Since 1850 the work week has been shortened from 70 hours to 43 hours, and the first generation of laborers in history has known leisure time. I estimate that a man today works about 80,000 hours in the course of his lifetime, sleeps 200,000 hours, and has 320,000 hours left for himself. His working hours represent less than 15 per cent of the total. He has four hours free, awake, for every hour he works. In 1900 the ratio was only about 1.6 instead of four. Nearly 2,000 years elapsed, between Archimedes and Newton, but it is only in the past 50 years that man has doubled his hours of leisure.

Leisure time is not an end in itself, but it gives man freedom and power in

the most fundamental sense. One bushel of grain, representing a measure of the necessities of life, cost the English laborer the equivalent of six days' hard work in the reign of Elizabeth; today a bushel of grain is equivalent to less than three hours of labor. The gain is available for what man pleases — for education, recreation, loafing, or for the all-out effort of war.

Leonardo da Vinci understood the principles of flight 400 years before the Wright brothers first flew, which they did in the year I was born. Today air travel is routine, and on this continent air travel (passenger-miles per year) exceeds the corresponding figures for Pullman travel. Jet propulsion is but 10 years old, yet jet engines are now being used for air-passenger service. Air travel with nuclear power

Boeing Airplane Company



Jet propulsion is but 10 years old, yet jet engines are now being used for air passenger service.

plants, if not "just around the corner," appears to be entirely feasible. Our time scale is indeed collapsing, and it is no wonder that the public confidently expects a scientist to make a trip to the moon almost any day.

The automobile, not much older than the airplane, has proved to be an essential labor-saving device. Its brother, the tractor, has made it possible for a smaller farm-labor force to grow food for more people. The new textile fibers have freed us from dependence on the silkworm, and it now seems probable that wool will shortly be replaced by something better. Motion pictures, radio sets, and record players have brought entertainment and good music to millions, and the writer notes that, in M.I.T. dormitories, radio receivers are tuned as often to classical as to popular music. Central heating, electricity, washing machines, refrigerators, and dishwashers have largely eliminated drudgery from the home. In passing, the writer admits to a slight doubt regarding home labor-saving devices, since he spends some of his 320,000 hours of leisure time repairing the toaster, vacuum cleaner, power lawn mower, or other gadget.

The developments in medical science in very recent years have been particularly spectacular, and it is not possible to list even the more important ones. Although the statement cannot be documented, it seems probable that two antibiotics — penicillin and streptomycin — have saved more lives in the last six years than were lost during World War II by Britain and the United States combined. It now seems likely that synthetic cortisone will be commercially available within two years at most, and the rapidly developing chemistry of proteins, steroids, and hormones bids fair to produce new wonder drugs.



Ford Motor Company

It now seems likely that synthetic cortisone will be commercially available within two years at most, and rapidly developing chemistry of proteins, steroids, and hormones bids fair to produce new wonder drugs.

But why has the rate of scientific progress increased so rapidly during the last generation? It is true that we have many more scientists, but I see no evidence that they are better scientists than Newton, Boyle, Carnot, Lavoisier, Faraday, Thomson, or other great names of the past. I believe that the answer lies in the relatively new invention and development of a system for utilizing the results of science. This is the system of teamwork among scientist, engineer, and manufacturer.

Let us review how this system operates in a particular case — the spectacular development of inexpensive penicillin. Wolff in the Eighteenth Century, and Koch and Pasteur in the Nineteenth Century, had discovered the cell structure of tissues and laid the foundations of modern bacteriology, but it was not until 1929 that Sir Alexander Fleming noted the bactericidal action of the mold *Penicillium notatum*. Sir Howard W. Flory and his co-workers at Oxford obtained pure penicillin in 1940 and its nontoxic and antibiotic characteristics were quickly established. At this point, the work of the scientists was essentially done, and engineers in industry took over.

Incidentally, one of the first lives saved by penicillin was Churchill's, and thereby hangs a tale worth relating. About 1890, an English school boy was vacationing in Scotland. One hot day he stopped at a small lake and went for a swim. But the water was very cold, and the boy developed bad cramps in his legs. He was beyond his depth, and was about to drown, when a young Scotch farm boy swam out and pulled him into safety.

Hearing of the incident, the English boy's wealthy parents traveled to Scotland to look up the lad who had saved their son. They found the Scotch boy to be poor but of great intellectual promise, and they rewarded him by financing him through the university.

The scene of the second part of this story is Cairo, about 1942, where Prime Minister Churchill lay terribly ill with pneumonia. A wireless message brought Dr. Fleming by airplane from London, with just about the world's supply of penicillin in his pocket. The penicillin worked its wonders, and so, for the second time in 50 years, Dr. Fleming had saved Mr. Churchill's life.

The rest of the penicillin story is well known. Teams of engineers and scientists developed methods of growing the precious mold in thousands of large flasks; submerged fermentation eliminated the flasks and led to large-scale production in tanks holding many thousands of gallons each. Chemical engineers developed plant processes for the recovery of the penicillin from the exceedingly dilute fermentation liquors. Biologists and chemists developed analytical techniques. Packaging methods were worked out for handling the product under sterile conditions. The price of penicillin dropped from \$20 to \$0.04 per 100,000 units, and the death rate from pneumonia has been cut in half. A new multimillion-dollar business is now thriving where nothing existed before there was teamwork of scientist, engineer, manufacturer.

This is a story of teamwork. Scientist, clinician, biologist, technician, chemical engineer, chemist, plant foreman, laborer, and company executive —

(Continued on page 312)

Audio Engineering Comes into the Home

Engineering Achievements in Sound Recording and Reproducing Systems Account for the Current Popular Interest in Music for the Home

By C. J. LeBEL



Harold M. Lambert

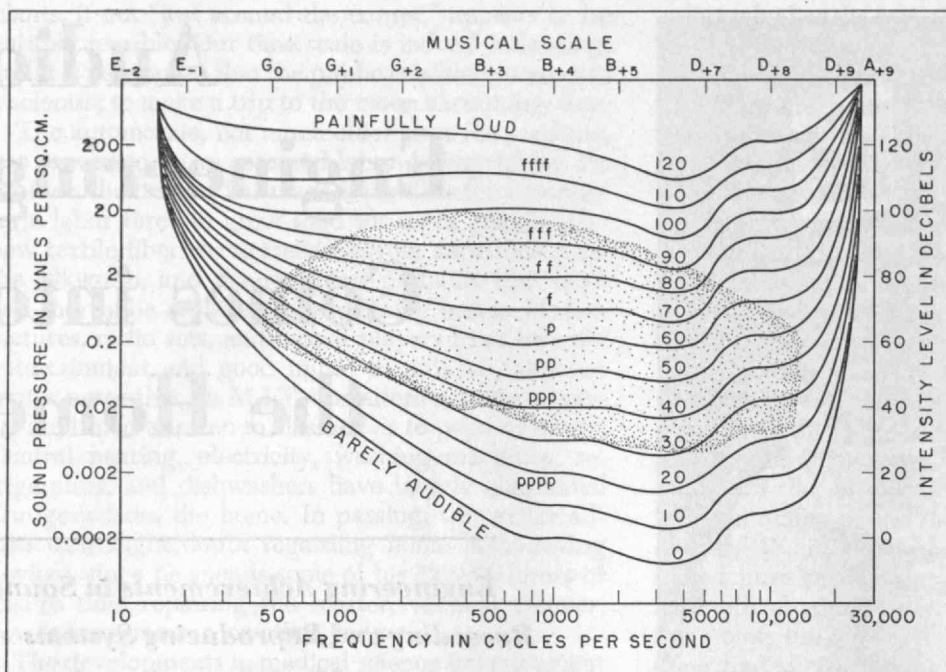
It has been conventional to cite the proverbial "man bites dog" as an example of the totally unexpected, but occasionally an industry bites the experts. If experts can find neither technical nor economic justification for the new industry—whereupon it doubles in size every year—the result can be very interesting.

The audio industry is a good example of such unexpected rapid growth. It is a good example, too, of the rapid flowering of techniques which takes place when the opportune time has arrived. As the oldest branch of electrical engineering (which began with the commercial use of the telephone) audio engineering long preceded the commercial power branch. Philosophically, the comparative antiquity of this branch of engineering seems logical, for the need for sound, speech, and music certainly preceded man's requirements for electrical power. Moreover, from many points of view, the scientific and engineering basis of audio engineering is certainly broader and more general than that underlying other phases of electrical engineering. An example of this statement immediately comes to mind when we consider the range of frequencies involved in these two fields. A band of frequencies of from 20 to 20,000 cycles per second, about 11 octaves (representing a ratio of about 1,000 to one) is required for good reproduction

of sound, whereas power engineering deals almost exclusively with 60 cycles per second or some other single frequency. Even the frequency spectrum encountered in radio engineering seldom deals with more than a fraction of an octave in any given instance.

The audio industry serves a large field having many ramifications of a highly specialized nature. For example, it serves and is concerned with architectural acoustics, public-address systems, interoffice-communication systems, radio and sound motion-picture equipment, sound recording by tape and disc, and various methods of reproducing "canned" music, including the juke box. Since the field is so large, this article will concentrate on merely a small facet of the whole and will emphasize recent developments which make possible high-quality reproduction of sound in the home.

Our respect for the field of high-quality sound reproduction for home use rises when we realize that total sales in 1950 were estimated at \$250,000,000. This sum represents a very substantial fraction of the 1.3 billion dollars taken in by the entire home radio-television-phonograph field. Radio jobbers who have featured equipment for high-quality reproduction of sound have increased their business in startling fashion by thus catering to the connoisseur.



Based on the research work of Fletcher and Munson of the Bell Telephone Laboratories, this diagram indicates the relationship between frequency (or pitch) and sound pressure (or intensity) to which the normal human ear responds. No hearing occurs below the zero contour marked "barely audible," whereas sound becomes painful for intensities just above the words "painfully loud." The dotted area represents the range of frequencies and sound levels encountered in orchestral music. The musician's intensity scale is a subjective and personal one which cannot be accurately related to the curves shown, although the f and p designations have been included to give a general impression of a possible correlation.

M.I.T. Illustration Service

New Developments in Sound Reproduction

For many years the tone quality of most mass-produced home radio sets and phonographs remained at a low level through limitations imposed by the high cost of cabinets, and by the lack of adequate audio engineering. A large part of the cost of such equipment went into cabinet work to satisfy eye appeal and few manufacturers have been seriously interested in making an all-out effort to obtain the best tone quality possible with the money available. The engineering departments of radio manufacturers have traditionally been headed by radio engineers, and designs have accordingly reflected radio thinking. Radio sets have been designed primarily for picking up weak signals, and only secondarily for making the signals sound as good as possible. A number of studies have been advanced to demonstrate that the public could not recognize and would not pay for good tone quality in home radio equipment. Nearly all these proofs were based on the common misunderstanding of radiomen that wide tonal range and high quality were synonymous.

Actually, the public was often repelled by the high distortion (and noise) that usually accompanied the sound when reproduced on equipment which the average radio engineer regarded as being of "high fidelity." The public also objected to the surface noise of the average disc record. Despite this, one large manufacturer was able to achieve outstanding commercial success in the 1930's by consistently producing radio receivers which were less fatiguing to listen to and of better tone than those of his competitors.

Today the purchaser of high-quality components (such as improved loud-speakers and cabinets, amplifiers, records, and record changers) finds that he can achieve startlingly better reproduction of sound in his home than he could have with a standard mass-produced unit at several times the cost. Furthermore, he can secure the features which he wants,

which, in many cases, are not available at all in standard radio-phonograph units. Finally, he can fit the components into the most convenient locations and is not required to move everything around to fit a cabinet of arbitrary size.

Many reasons may be advanced for the rapid rise in the use of truly high-quality sound reproduction in the home. Undoubtedly the availability of well-designed equipment and components, which has made possible the bringing into the home of operas and symphonies with reproduction comparing very favorably with the original rendition, has been an important factor. So too have been the altogether too few instances of good music programs which can sometimes be heard on the usual broadcast channels or the higher channels used in frequency modulation. Undoubtedly a controversial issue is raised by suggesting that public apathy toward mediocre radio programs and sound motion pictures has had its influence in promoting the sale of equipment which brings into the home that music which the listener wants to hear, when he wants to hear it, and without the accompaniment of obnoxious advertising chatter. Nevertheless, the success of those radio stations which have attempted to generate high-quality program material (such as WQXR in New York, or WGBH in Boston, for example) indicates that not everyone is forever going to be satisfied with "soap opy" or Howdy Doody.

Some Long Words Simplified

A discussion of the methods by which sound is reproduced entails the use of terminology which reflects the specialties of the engineer, the musician, and even the psychologist. If we are to avoid the pitfalls of appealing to one or two of these groups rather than to all three (as well as the reader), it will be beneficial to come to a common understanding of the terms employed. Perhaps this can best be done by giving a very brief — and not too technical — re-

view of the elements of hearing and sound reproduction.

It is common experience that persons with normal hearing can distinguish audible tones on the basis of their frequency or pitch, as well as on the basis of their intensity or volume. Willfully ignoring some of the more subtle points which interest the serious student in this field, we may say that pitch is the musician's term, whereas frequency is the engineer's term for the number of vibrations per unit time. Hearing studies have shown that the "normal" ear can hear airborne vibrations of from approximately 20 to about 20,000 cycles per second, corresponding approximately to the 11 octave range from E_{-1} to E_9 on the musician's scale. The range of tones which may be heard by persons of normal hearing depends not only upon their age and physical well-being, but also upon the intensity or volume of the sound. The ear is most sensitive in the range of middle tones, from about 500 to 5,000 cycles per second or, roughly, from B_3 to D_7 . Within this portion of the audible spectrum, the ear can sense sounds whose volume or power intensity extends over a range of 10^{12} trillion to one. In the musician's language, this 10^{12} ratio covers the volume range from exceedingly soft to exceptionally loud sounds. The ear is not uniformly sensitive throughout all of the tonal range it hears, however. At the extreme frequencies, the minimum sound intensities which can be heard are also those which are simultaneously so intense as to produce pain; beyond such points, the term "hearing" has no meaning, of course. The nonuniform sensitivity of the human ear requires that equipment intended for high fidelity reproduction of sound be designed to take account of such physiological factors.

Sounds of music or communication are not pure tones, but are a highly complex synthesis of components of many frequencies; they almost invariably have very complicated wave forms. The presence or absence of harmonics is one of the factors which enables us to distinguish sounds of various voices (or those produced by different instruments) when both sound the same fundamental pitch.

From the engineer's point of view, sound — vibrations of air molecules — may be produced by the vibration of a diaphragm (in a loud-speaker or telephone headset) which in turn is actuated by electrical power from an amplifier at the output end of the electronic system. The electrical signal fed into the amplifier may be the electrical variations from a radio receiver or a microphone. Where sound is to be "canned" for reproduction at some later date, the original sounds may be impressed as mechanical undulations in the spiral grooves of a disc record, or as variations in the magnetic condition of a wire or tape. In any case, a whole series of elements in a chain are required to convert sound into its electrical counterpart and then back, after suitable amplification, into sound energy.

Even this brief and very elementary discussion is sufficient to show that any system for the reproduction of sound must be designed to meet exceedingly stringent requirements if the end product is to be a faithful replica of the original sound. For example,

such a system must operate over a very wide range of frequencies, and also over a very considerable range of sound intensity, and it must do so without appreciable distortion or change of wave shape, and without introducing noise. In practice, no system is able to fulfill these requirements fully over the extreme ranges which are desirable. The best we can hope to do, in any practical case, is to design and build sound-reproducing systems whose performance is sufficiently good that the difference between ideal and actual performance is accepted as being small even to the trained ear. Such achievements are now possible and at costs which are very modest, considering the complexities of the problem.

New Development in Discs

Notwithstanding much interest in radio and television, and the use of magnetic tape for reproduction of sound in the home, a number of factors conspire to favor the disc. Time has proven that the manufacturers who elected to pioneer the new disc developments were wise in their engineering foresight.

The most obvious advantage in the use of discs is the ease of selecting the desired material. With a disc the records may be loaded on the turntable in a second, and the needle placed in the desired groove in another second. With tape recordings the ribbon must be threaded through the reproducing head and run until the desired point has been reached; often this operation becomes a matter of two or three minutes.

As compared to music reproduction by discs, entertainment by radio suffers from two serious handicaps. The more obvious of these is the difficulty of program selection. When the available radio programs are uninteresting to the serious music lover, he has to find his preferred material on a disc. The more subtle handicap of radio programs is one of listener fatigue, induced by a minor economic consideration. To date all the networks (except for one minor FM group) lease long-line telephone circuits which will transmit frequencies up to only 5,000 cycles per second — far short of the normal hearing limit or the range of 12,000 to 15,000 cycles per second which can be recorded on discs. For a number of reasons such a hedged-in range, reproduced over a still poorer home radio receiver, is a strong inducement to listener fatigue, and consequently, after a while the victim yawns and turns off his set. On the average, telephone circuits of improved frequency range would increase the cost per radio station by an amount less than the present salary of one good technician. Lagging set sales and reduced hours of use in any locality where television ceases to be a novelty supports the thesis that television has little to offer to those seriously interested in good music. Bedeviled by the problem of unobtrusive pickup of sound, television has too often enforced very poor microphone locations; the microphones are inconspicuous but too often wretched sound results. If the program is shown on both radio and television, the microphone positions are still dictated by the need to elude the ubiquitous lenses. So, in a way, television has injured the sound quality of broadcast programs.

The radio station which caters especially to the serious listener can bring him fine reproduction via records and radio transcriptions. In this way much good material can be made available economically, but radio programs provide no answer to the listener's desire for given material at a specified moment.

The new developments in discs make possible increased convenience and lower cost per minute of recorded time. At the same time, they make a greater part of the disc cost available for improved material and better workmanship. As a result of these factors, sound by discs is presently enjoying its biggest boom.

Improvements in Sound Reproduction

In the late 1930's, components for building better home equipment for sound reproduction became generally available to the technically inclined, and one large manufacturer of records began development of discs which could be made relatively free from surface noise, without costing more to make than the old style disc. Development was retarded during the fighting, but was resumed after World War II.

The best disc in the world is of no avail without suitable means for properly converting the undulations of its spiral grooves into electrical energy. As better discs were evolved, the need for accessory phonograph components became apparent and development work was begun. At first, attention was directed to the improvements in the mechanisms—called reproducer heads—for converting mechanical motion of the phonograph needle into electrical energy. Improvements in this field called for corresponding betterment of the supporting arm and turntable. In time wholly new and greatly improved reproducer heads were developed which reduced wear of the record. Engineering analysis was applied to the design of the supporting arm to obtain greater freedom from undesired resonance effects and to produce less distortion as the arm traveled from outer to inner grooves, and turntables were designed and built for greater mechanical precision to attain constant speed during operation.

Improved reproduction, which the new discs made possible, forced an improvement in amplifiers, loud-speakers, and other elements in the sound system. For the first time in many years, new amplifier circuit principles were discussed. Various types of amplifiers for home use, with unusually uniform response over the entire audible tonal range, were developed. These would develop their rated "undistorted" power output over an unusually wide frequency range, so that extremely low and high frequencies were amplified as clearly (as well as loudly) as tones in the middle range. By the use of better output transformers between the amplifier and the loud-speaker as well as by special circuits, distortion was reduced to match the lower distortion of the new reproducers and discs.

As the final link in the chain, better loud-speakers were developed. Improvements in speakers made possible wider tonal range with better reproduction of the transients which form such an important part of music. Some attention was also given to more uniform distribution of sound, so that the sounds of

higher frequencies would not be concentrated in a narrow beam as formerly was the case.

Microgroove Records

It is possible to increase the playing time on a disc of a given size by placing the grooves close together, or by allowing the disc to turn more slowly. Both expedients are used in the modern disc. If we were to reduce the disc speed only, we would find that the undulations in the groove convolutions had become so fine that the tip of an old style phonograph reproducing stylus could not follow them with the desired detail, and harsh tracing distortion would result. It was this that spelled the doom of the first widely sold long-playing home records in the early 1930's.

In the modern disc a finer groove (called microgroove) is used. The reproducing stylus has a tip of smaller radius in order that it may follow the finer details with negligible tracing distortion. Improvements in disc materials also made possible drastic reduction of surface noise so that it became feasible to reproduce frequencies as high as 12,000 or 15,000 cycles per second, which is very close to the upper frequency limit of hearing for the normal human ear.

By obtaining more playing time on a record of given size, the cost of materials for discs, per minute of playing time, was reduced to the point where the quietest and costliest pressing stocks became commercially feasible. This has led to extensive use of unfilled (pure) and lightly filled vinyl stocks in place of the heavily filled shellac which was so common 10 years ago.

The idea of microgroove is old, being based on the research work of Frederick V. Hunt of Harvard University and his collaborators in the late 1930's. The application of microgroove principles to commercial home phonograph records seems to stem from the work of Rene Snepvangers at RCA Victor in the early 1940's, but extensive use had to await the development of commercial reproducers so light that they could track a groove with only six grams of force on the stylus.

Microgroove developments have followed two paths: in one case a seven-inch disc now provides five minutes of playing time per side, which had long been standard; in the other case, the long-playing 10- and 12-inch discs increase the nominal playing times to 15 to 22 minutes per side, although 28 minutes is possible. The seven-inch disc has proven well suited to the recording of single selections of popular music, and it is claimed that this field is 80 per cent of the potential market. The long-playing discs of larger diameter have uniquely filled a need in the fields of classical music and drama. In the seven-inch size a battle has raged between proponents of 33 $\frac{1}{3}$ and 45 revolutions per minute, and the higher speed seems to have won. In the field of long-playing records a speed of 33 $\frac{1}{3}$ revolutions per minute has not been commercially challenged, although a recent study by an engineer of the British firm, Electrical Musical Industries, seems to point toward the advisability of 45 revolutions per minute.

Modern Disc Recording

So far as concerns the ultimate consumer playing records in his home, the best modern discs are able to reproduce all sounds equally well up to about 12,000 or 15,000 cycles per second. Such essentially uniform response throughout the audible spectrum is not easily obtained, however, and the fact that it is, is a tribute to those who have designed and made possible modern recording techniques. A number of separate and independent operations must be gone through before it is possible to stamp out the disc for the home user. In each step the highest degree of engineering skill is required if the end product is to be capable of reproducing all audible sound without appreciable distortions.

The first step in the production of modern records is to make the initial recording on a magnetic tape. This recording is edited, and re-recorded onto a blank disc of aluminum, coated with special lacquer, for wax* has been obsolete as a "master" material for more than a decade. To secure the lowest noise level and the widest frequency range, a heated cutting stylus is generally used in making the master disc. The resulting lacquer master is plated to produce a metal master negative, and by further electroplating, mothers (positives) and stampers (negatives) are made. Production records are pressed from the stampers.

Commercial records have always been too variable in quality; but now that the economic factor has been minimized, there is less excuse than ever for variability. One means of reducing variability has been the use of tape recorders, whose mechanics of

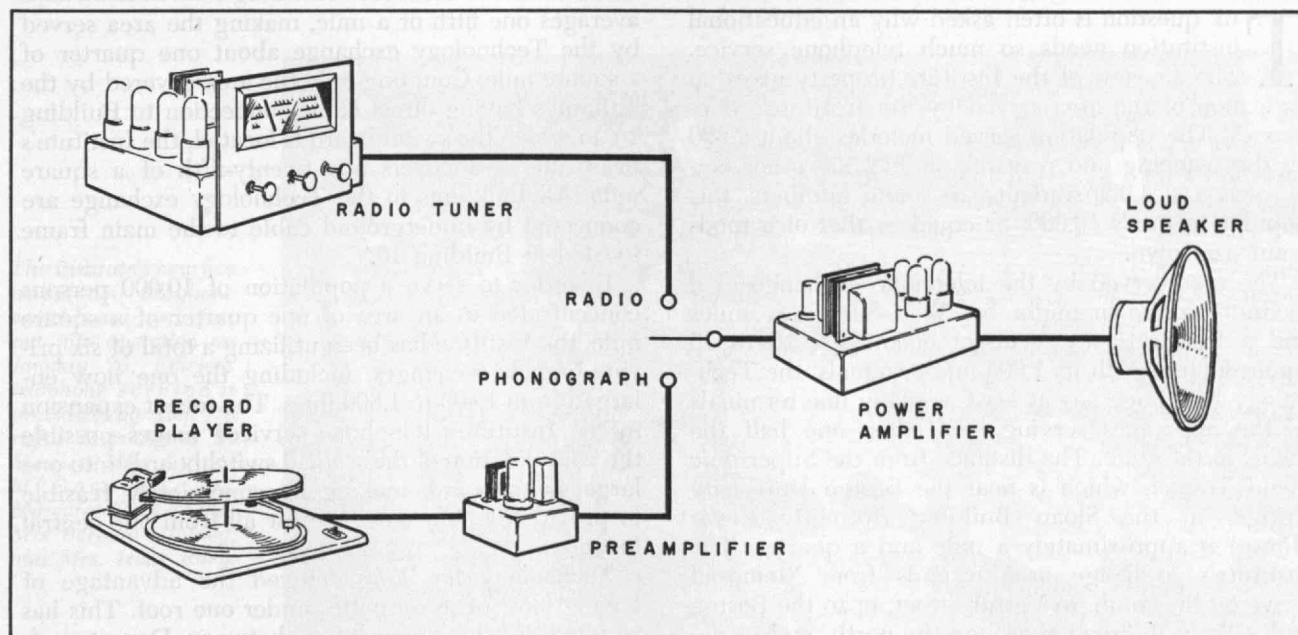
* Incidentally, "wax" is not a wax at all, but is a metallic soap.

operation are so simple that almost anyone can produce an *approximate* facsimile of the input. In the smaller organizations, almost anyone does record — one firm even used a record critic! There has been a tendency for semi-skilled operators, lacking a good technical background, to record at too high a level. The machine noise is better subdued thereby; but peaks are clipped, deleting much of the accent and emphasis which make a musical selection of interest. Crescendos somehow do not quite materialize, and the result is tasteless.

Many long-playing records have been produced by re-recording from older 78 revolutions-per-minute records of the 1930's. To reduce the noise level to a tolerable point, the response at the higher frequencies is often virtually extinguished. Too many German wartime broadcast tapes, recorded on the early Magnetophones, have been used, with doubtful frequency range and occasionally high distortion. Such practices cannot result in records which meet modern standards. Since even a poor recording can be sold if the artist is sufficiently well known, there has been a tendency to rush production and to relax some of the high standards of two years ago.

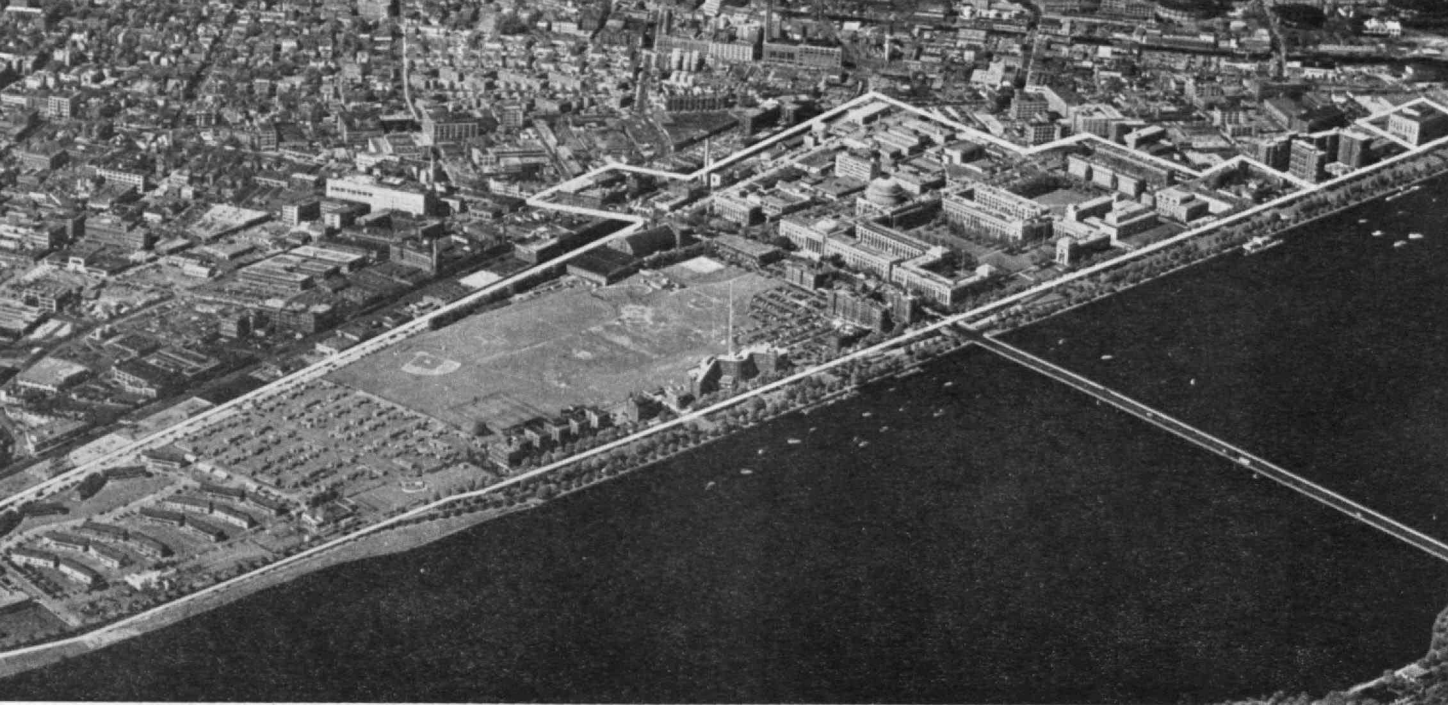
Finally, we still have a mild degree of anarchy as regards recording characteristics. In order to minimize surface noise it has been necessary to subdue the lower tones and accentuate the higher pitched tones during recording. The degree to which intentional emphasis is thereby given to the higher frequencies is called the recording characteristic. In order that the final result may be as intended, an exactly inverse compensation (called the reproducing characteristic) should be used during reproduction of the disc. It has proven impossible to define the recording characteristic exactly, for it is affected

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M.I.T. Illustration Service

The essential elements of a sound-reproducing system for home use are illustrated in this block diagram. Sound reproducers using magnetic tape or wire may be used in place of the more popular disc recorder shown here. When basic audio components, such as those indicated above, are assembled into suitable cabinet furniture, the music enthusiast can reproduce at will "live" or "canned" music, no matter whether his taste runs to Bach, Beethoven, and Brahms, or to boogie woogie.



M.I.T. Photo

Most of the Institute's internal telephone service is concentrated within the area bounded by the white band shown in this aerial view of that portion of Cambridge bordering the Charles River basin.

Telephone Service for the Institute

*Adequate Communication for 10,000 Persons along One
and One-quarter Miles of Charles River Front Poses*

Some Unusual Problems in Telephone Service

By CARLTON E. TUCKER

THE question is often asked why an educational institution needs so much telephone service. The air view of the Institute property gives an indication of the area served by the Institute's telephones. The population served includes about 2,300 on the teaching and research staff, 2,500 other employees, and 4,900 students. In round numbers, this population totals 10,000, or equal to that of a moderate-size town.

The area served by the telephone exchange of a medium-size town might be 20 to 30 square miles and a base rate area* might encompass 10 to 15 square miles. With its 1,804 line terminals, the Technology Exchange has at least as many line terminals as the exchanges serving more than one half the towns in the state. The distance from the Supersonic Wind Tunnel, which is near the Boston University Bridge, to the Sloan Building (formerly Lever House) is approximately a mile and a quarter. The Institute's exchange area extends from Memorial Drive on the south, to Vassar Street, or to the Boston and Albany Railroad tracks on the north, and in the cases of the Hood and Whittamore Buildings, even includes some area across the tracks. This distance

averages one fifth of a mile, making the area served by the Technology exchange about one quarter of a square mile. Counting only the area covered by the buildings having direct cable connection to Building 10, in which the switchboard is located, the Institute's base rate area covers one twenty-fifth of a square mile. All buildings in the Technology exchange are connected by underground cable to the main frame located in Building 10.

In order to serve a population of 10,000 persons concentrated in an area of one quarter of a square mile, the Institute has been utilizing a total of six private-branch exchanges, including the one now enlarged from 1,400 to 1,800 lines. The recent expansion in the Institute's telephone service† makes possible the consolidation of these small switchboards into one large switchboard, making it economically feasible to provide 24-hour coverage for all from one central location.

Technology has long enjoyed the advantage of having most of its activities under one roof. This has resulted in close association between Departments and in the building of a unified Institute. The continuing expansion of our activities into many sepa-

*The base rate area is that area for which the minimum service charge applies.

†"M.I.T. Expands Telephone Service," The Technology Review, 54:251 (March, 1952).

rate buildings, over a wide area, tends to break down some of these contacts. A unified telephone system, serving the entire Institute, helps preserve these former close relationships which are so important to successful teamwork between Schools and Departments at the Institute.

The Technology Telephone Office contains a large operating room, 16 by 21 feet, for the new four-position manual section; one switch room, 23 by 34 feet; and a second switch room, 10 by 14 feet. An operators' rest room will be provided in the space now occupied by the former manual board. The entire space is air conditioned by a five-ton unit.

To provide outgoing service in the local metropolitan area, a total of 47 lines, terminating in the University central office, are provided. Those lines are associated with toll-diversion equipment, so that only local calls can be made, and attempted toll calls are referred to one of the M.I.T. operators. Incoming service, as well as outgoing toll service, is provided over 40 manual lines from the Kirkland central office.

One of the features of the M.I.T. system which makes for distinctly improved telephone service is the block numbering arrangement used in conjunction with automatic hunting over consecutive numbers. The major courses of instruction at the Institute are numbered, as are also their subjects of instruction. The telephone numbers are similarly classified. For example, Electrical Engineering is Course VI and therefore has extension numbers starting with the digit "6." The numbers are arranged in groups of 10, with the number ending in "1" available to a secretary. If, as often happens, "Don't Answers" result from a professor's being in class, it is generally possible to hang up, redial the call, changing the last digit to "1," and locate a secretary, who is nearby the office of the professor in question. She can put a message on his desk asking him to return the call. The departmental arrangement of numbers on the manual

board makes it much easier for the operators to locate individuals without referring to information directories.

The manual part of the system has a number of features not regularly provided in private-branch exchange switchboards which should make for improved service. These are:

Desk-height operating key shelf.

Small plugs and jacks making all line terminals within easy reach of an operator.

Automatic ringing when operator completes a connection.

Idle trunk-line lamp indicators saving the operator from testing when making an outgoing toll call.

Automatic flashing recall whereby telephone users can attract the operator's attention by depressing the handset cradle only once.

The handling of incoming calls for students in the four residence houses involves the use of a private internal system. Two of these houses use manual telephone switchboards with telephones in each student's room. The other two housing units are served by a 300-line dial system. This provides telephones in each room of one dormitory and in the corridors of a second. Students are called from the outside by dialing the Institute's telephone number, KI 7-6900. This call is received by, or referred to, the operator covering the information position. She has access to a complete Flexoline file of dormitory residents. After looking up the student's residence location, she calls the manual operator or the desk clerk in the house in which he resides. The dormitory telephone operator, or desk clerk, locates the student over the internal telephone system and tells him that he has an outside call. To provide for extending these incoming calls to the dormitories, some 88 extensions from the main switchboard are provided in the corridors of the four

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The Institute's new five position telephone switchboard was first put into operation on January 26. Efficient telephone service is provided by (left to right) Miss Agnes N. Morrice, Miss Agnes McDonough, Mrs. Margaret Donahue, Mrs. Barbara Whitney, and Mrs. Irene Riley.



M.I.T. Photo

Economics at M.I.T.

The Economics Staff, with Diverse Backgrounds and Views,

Aims to Impart a Technique of Logic for Solving

Economic Problems in a Complex Society

By RALPH E. FREEMAN

ONE of the most difficult problems confronting the professional teacher of economics is the competition he meets from other and more effective teaching agencies. The writer refers to the educational impact of the home, the press, and the radio, as well as the propaganda coming from special-interest groups of one kind or another. These agencies have a competitive advantage. The teacher may be in contact with his class for only two or three hours a week for a part of a year, while his nonacademic competitors have been working on these students since their early childhood.

This disadvantage may seem to raise the question as to whether the economist can really teach the subject at all. Doubts on this score are further increased by the unsettled condition of the world during the last decade—a state of affairs that has created many uncertainties for the individual. A student worried about his future can hardly be blamed for indifference toward a subject which often seems dull and remote from his immediate interests. Another disadvantage is the youth and inexperience of the average college student. Favorable experience with the veterans who came to the Institute after World War II indicates that maturity is a great advantage in the study of economics. All these difficulties in the way of the teacher tend to make him humble when appraising the impression he leaves on the minds of the younger generation.

These obstacles, however, are also a challenge to the economist to improve his teaching techniques. The Economics staff at the Institute has been continually experimenting with new materials and methods and, though it is not fully satisfied with the results, progress has been achieved. We have tried to keep up with the increasing mass of quantitative data becoming available and to keep abreast of improvements in analytical techniques and of shifts in emphasis resulting from changing economic conditions.

An interesting example of such a shift is to be found in the treatment of unemployment and price levels. Prior to the 1930's, these problems were of secondary interest to most economists. A great deal of what they wrote and taught was based on the assumption of full employment and relatively stable prices. The attention of economists was directed mainly to the way in which productive agencies were allocated among various industries and enter-

prises. The leading problem was to discover that distribution of human and material resources which would best promote the material well being of the people.

In recent years the economist's inquiry has focused on economic fluctuations. Unemployment of resources has thus become a major problem for investigation along with a study of changes in the level of prices. Because ups and downs in employment and periods of inflation and deflation are associated with changes in income available to purchase goods and services, the spotlight has been turned on income analysis. The study of national income has been stimulated by the publication of improved statistics emanating chiefly from the Federal Government and by the development of new and better techniques of analysis.

These statements are not meant to imply that the traditional subjects have been abandoned. The economist is still trying to explain what the economic system is and how it operates. He is still concerned with the role of prices and profits in organizing economic activity and with the functions of money and markets in assigning labor and capital to their more productive uses. What has happened is a reorientation of these traditional inquiries around the problems of income, employment, and price levels. This new approach seems to have brought the study of economics nearer to the daily lives of people and closer to the problems with which businessmen are most vitally concerned.

The fact that the beginner in economics is normally young and inexperienced makes it necessary for the teacher to spend a good deal of time describing the facts of economic life. National income, for example, only becomes meaningful as it is broken down into components and expressed in quantitative terms. It is usually desirable, therefore, to start with a discussion of the income of individuals, corporations, and governments. How is the total income of the nation divided among families and groups? How are corporations organized? How do they compute their earnings? What is the role of government and what changes are taking place in the relation of the government to the individual and to business? These are among the questions with which the student of economics is confronted in the early stages of his study. In addition, in most of the subjects offered, time is devoted to describing various institutions

such as banks, labor unions, and farmers' organizations which help determine the nature and direction of economic activity.

The main objective of economic education, however, is not to fill the minds of students with facts and statistics, but to impart to them a technique of thinking by means of which they can analyze and solve economic problems for themselves. General principles must be developed that are applicable to a broad range of situations. Among these principles are those that can be applied in understanding changes in the price of goods, changes in wages, interest, and profits, in the general price level and in the national income.

The economist is concerned, for example, not so much with what the price of wheat is or has been, as he is with the forces that interact to determine the price of wheat or any other commodity. Though he may study past changes in national income, he is primarily interested in the reason why the national income shifts from one level to another. In other words, he tries to develop an integrated theoretical framework which can be used in the analysis of economic problems.

At M.I.T., the economist is regarded as a teacher, not a preacher. His function is not to radiate his own political views nor to propagandize for his own particular social philosophy. His job is to encourage students to form their own opinions. He is not too concerned with what these opinions are. His main job is to ensure that the opinions, whatever they may be, are reached through a logical process of thought, rather than as a result of prejudice or hearsay.

The Economics staff of about 30 full-time members has been recruited with this objective in view. When a new man is taken on, we ask two main questions. Is he equipped by training, experience, and intelligence to carry on creative, scholarly work in his chosen field? Is his personality such as to hold out the promise that he will be a competent teacher and a congenial and co-operative colleague? As the result of this method of selection, the group we now have includes no freaks or extremists. Though there is a broad diversity of view on many of the controversial issues of our times, all of the members of the Department share a desire to preserve and improve the free institutions of America. These men rank high in the profession and compare very favorably with economists in other leading institutions.

Some people may find it hard to accept the idea that divergence of opinion should be regarded as a healthy condition. Why, it may be asked, should I tolerate a colleague who disagrees with me on government controls, the merits of labor unions, taxation, monetary policy and other questions? My answer would be that differences of opinion give rise to a lively interchange of ideas which is an important element in the educational process. Progress in economics, or in any other scientific discipline, would be stifled if an effort were made to enforce conformance to a single pattern of thought.

No matter how firmly we may believe that a given policy is the correct one, there is always a good chance that the man with a different opinion may have something meritorious to propose on his side.

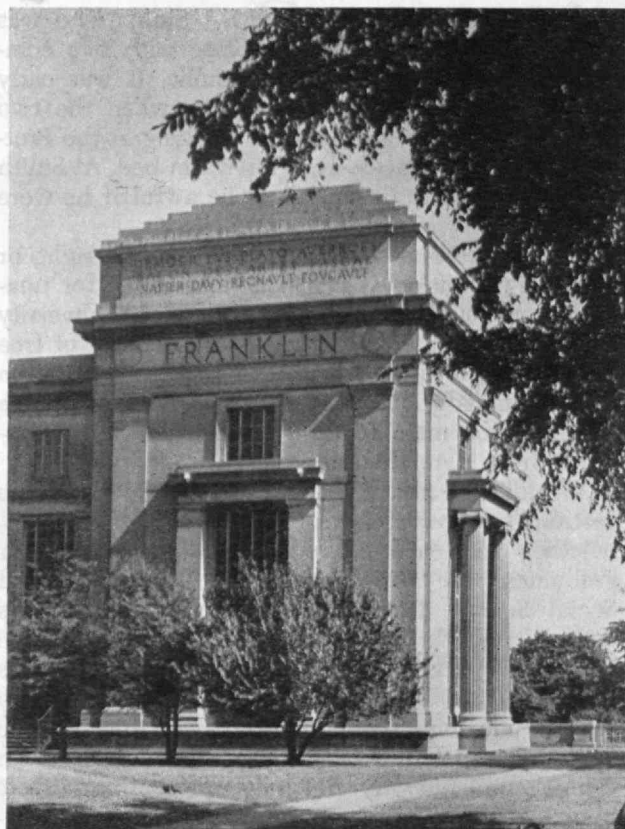
A story is told of Al [Alfred E.] Smith who was traveling in upper New York State with two companions, a Protestant and a Catholic. It was early on a bitterly cold Sunday morning when the two Catholics arose to attend mass. Looking at the Protestant sleeping peacefully in his warm bed, Al Smith said to his friend: "Wouldn't it be awful if he were right and we were wrong!"

The chance that the other fellow may be right, or partly right, makes it inadvisable to strive for unanimity of thought and opinion. Tolerance of diversity is necessary for the preservation of the spirit of free inquiry which is the breath of life of an institution devoted to education and research. Such tolerance is one of the **main features distinguishing** a democratic from a totalitarian society.

As indicated above, this concept is applied in the Institute's educational practices. In all courses, whether they are offered to undergraduates or graduates, the Department of Economics and Social Science tries to present contrasting views and opinions. In the beginning course in Economic Principles, which has been required of all students at the Institute, this procedure is subjected to severe time limitation. But even here this practice is followed. For several years we have been using supplementary readings presenting diverse points of view and a new collection of such readings to accompany the textbook has just been prepared — a compilation that includes extracts from economic writings of all sorts, ranging from Karl Marx to the National Association of Manufacturers.

Besides this course in Economic Principles, there are many others, both on the undergraduate and the graduate level. These include several in the fields of labor relations, statistics, finance, theory, and in-





ternational economics. There are courses in business cycles, technological innovation, and in the economics of particular industries. The Department also offers courses in psychology and international relations. As the name implies, the Department of Economics and Social Science is one that covers a wide field. It is a part of the School of Humanities and Social Studies and has close ties with the activities of historians and others who come under the same administrative direction. The bringing together of a number of different social studies exerts a broadening influence on both staff and students. It tends to make us look at human beings as members of an ever-changing, complex society subject to many influences in addition to those of an economic nature.

Virtually every student at the Institute takes economics at some point in his program. In addition to those subjects included in the Humanities Program, designed for the Institute as a whole, other subjects are tailored to fit the needs of professional courses such as those offered by the Department of Business and Engineering Administration. The Department also offers a four-year curriculum for undergraduates—Course XIV—leading to a bachelor's degree in Economics and Engineering. Through emphasis on relationships among engineering, economics, and human relations problems, this Course aims to provide students with an understanding of both technical and nontechnical aspects of our industrial society.

There is also a graduate division. There are about 50 students in this group, most of whom are candidates for the Ph.D. degree. Many of these men have come to M.I.T. from liberal arts colleges. They go into government, business, labor unions, and teaching as professional economists.

Because the training of the professional economist, normally requiring about seven years, is spent mainly in the classroom and the library, his knowledge of actual business practices is more limited than if he were actively employed in industry. This limitation of experience is a handicap of which the men on the Department's staff are acutely conscious. We do not have as much direct contact, as might be desired, with what goes on in the factories, banks, railroads, public utilities, and other business enterprises whose activities we study.

Efforts are being made to bridge the gap between economic theory and business practice. Graduate students are encouraged to find summer employment in industry. Some of the staff members have had temporary jobs in business or government. Others have had an opportunity to get into close touch with industry through research projects. In recent years they have undertaken investigations in textiles, shoes, coal, housing, electronics equipment, and a variety of other industries. Several of our instructors act as consultants to business firms and have had ample opportunity to rub shoulders with businessmen and get a better idea of their operations and problems.

The Department also brings in businessmen to meet with classes and join in round-table discussions. The system of Visiting Committees is also helpful in getting the staff into touch with leaders in industry, finance, and the professions. But more of these contacts are needed. If we are to keep our feet on the ground, we must have the counsel and criticism of men of practical affairs.

The development of the new School of Industrial Management should be of material assistance in strengthening our contacts with leaders in the business world. Though the Department of Economics and Social Science will not be administratively a part of this School, it will be housed in the same building and will co-operate in carrying out its educational and research program. E. P. Brooks, '17, Dean of the School, who is now in charge, is consulting with business leaders and hopes to enlist their aid not only in planning the project but also in executing the plans. The Department of Economics and Social Science should benefit, at least indirectly, from these extensive outside relationships.

We are grateful to the Alumni and other friends of the Institute who have taken an interest in our work. The Department is indebted to the companies which have supported our Industrial Relations Section, and have helped finance graduate fellowships and research activities; it hopes for a continuation of this interest and support. Such support will be needed if the Department is to maintain its position and to improve and expand its operations.

The number of students being graduated from Course XIV is now relatively small, and the demand for their services is high; but in the future we hope to increase the enrollment, and employment conditions are not likely to continue as favorable as they are today. This Course is new and therefore not yet widely known. Because it combines basic education in engineering and science, as well as in economics, and other social studies, its graduates have a broad

(Concluded on page 320)

THE INSTITUTE GAZETTE

PREPARED IN COLLABORATION WITH THE TECHNOLOGY NEWS SERVICE

Center for International Studies

To meet the growing need for an intensive study of world affairs in the fields of social, political, and natural sciences, as well as in economics, the Center for International Studies has recently been established at M.I.T. In making this announcement, Julius A. Stratton, '23, Vice-president of the Institute, also stated that Professor Max F. Millikan, of the Department of Economics and Social Science, had been appointed director of the new program.

It is hoped that this program, by seeking the source of international problems, will lead to a better understanding among the peoples of the world. Although primary interest will be focused on studies of an international scope, attention will also be devoted to domestic problems arising from the increasing obligations of the United States in global affairs. The Center will concentrate on studies which, while of basic scientific and academic nature, are pertinent to specific contemporary problems facing the country.

Dr. Millikan attended the California Institute of Technology and Yale University, receiving his bachelor of science degree from Yale in 1935. Following his graduation from Yale he studied in England at Cambridge University. Dr. Millikan was appointed an instructor in economics at Yale in 1938 and received his Ph.D. in 1941. He was appointed assistant professor of economics in 1941. During World War II, Dr. Millikan served as a research consultant to the Office of Price Administration; assistant director, Division of Ship Requirements, War Shipping Administration; and as chief economist, Intelligence Branch, Division of Research for Europe, State Department. Dr. Millikan returned to Yale in 1946 as a research associate. He was appointed associate professor of economics

at M.I.T. in 1949, and professor of economics in February, 1952. For the past year he has been on leave of absence to the government.

Dr. Millikan is a member of the American Economic Association, Econometric Society, Royal Economic Society, Institute of Mathematical Statistics, and the American Statistical Association. He is the editor and coauthor of a forthcoming book on income stabilization in a developing democracy.

Executive Assistant

THE appointment of Malcolm G. Kispert, 2-44, as Executive Assistant to the President of the Institute, has been announced by James R. Killian, Jr., '26, President of M.I.T. Mr. Kispert, who has served as administrative assistant to the president since 1946, was graduated from M.I.T. in 1944. He entered the Navy immediately after his graduation and served in the Pacific area, particularly the Hawaiian Islands, as an aviation engineering officer. Upon his return to M.I.T. in 1946, he was appointed to the administrative staff of the President's Office to assist Karl T. Compton, now chairman of the Corporation, and then Dr. Killian, the Institute's President since 1949.

Mr. Kispert was born in Fall River in 1923, received his early education at Durfee High School in that city, and entered M.I.T. in the autumn of 1940. He enlisted in the United States Navy in the fall of 1942, continuing his studies in uniform under the V-12 unit at M.I.T., and received the degree of bachelor of science in January, 1944. From January to September, 1946, he took graduate courses in Aeronautical Engineering and was awarded the degree of master of science.

M.I.T. Photo



◀ **Max F. Millikan**.....
Professor of Economics at M.I.T., has recently been designated as director of the Institute's newly established Center for International Studies. Julius A. Stratton, '23, Vice-president, and John E. Burchard, '23, Dean of Humanities, represent M.I.T. on the Advisory Board of the Center for International Studies, along with Paul H. Buck, Provost, and Edward S. Mason, Dean, of Harvard University, and Henry M. Wriston, President of Brown University.

.....**Malcolm G. Kispert** ▶
has recently been named executive assistant to the president, after having been on the administrative staff of the President's Office for the past six years.

M.I.T. Photo



Class Reunions

Plans for class reunions and get-togethers, to be held in conjunction with Alumni Day on Monday, June 9, and on other dates, are being formulated. The dates and places given below have been selected by the classes here listed whose members expect to hold gatherings this June.

- 1892 Tentative plans for luncheon or dinner to be held near Boston. Charles E. Fuller, reunion chairman, Box 144, Wellesley 81, Mass.
- 1897 June 9. Luncheon. Time and place not yet determined. John A. Collins, Jr., reunion chairman, 20 Quincy Street, Lawrence, Mass.
- 1900 June 10-12. The Pines, Cotuit, Mass. Elbert G. Allen, Secretary, 11 Richfield Road, West Newton 65, Mass.
- 1902 June 6-8. 50th reunion at Coonamessett Ranch Inn, North Falmouth, Mass. Claude E. Patch, reunion chairman, 862 Park Square Building, Boston 16.
- 1907 June 24-26. Oyster Harbors Club, Osterville, Mass. Bryant Nichols, reunion chairman, 23 Leland Road, Whitinsville, Mass.
- 1912 June 6-8. Snow Inn, Harwichport, Mass. Albion R. Davis, 11 Vane Street, Wellesley 81, Mass., and Ernest W. Davis, 6 Chapman Street, Arlington 74, Mass., are the reunion cochairmen.
- 1916 June 6-8. Coonamessett Ranch Inn, North Falmouth, Mass. Ralph A. Fletcher, Secretary, P. O. Box 71, West Chelmsford, Mass.

- 1917 June 6-8. Wentworth by the Sea, Portsmouth, N. H. Stanley C. Dunning, reunion chairman, 105 Irving Street, Cambridge 38, Mass.
- 1921 June 9. Class get-together in afternoon at Hotel Statler on Alumni Day.
- 1922 June 6-8. Sheldon House, Pine Orchard, Conn. Raymond C. Rundlett, reunion chairman, 6 Vine Street, Bronxville, N. Y.
- 1923 June 9. Class get-together at 5:00 P.M. at Hotel Statler on Alumni Day.
- 1927 June 6-8. 25th reunion at Oyster Harbors Club, Osterville, Mass. Glenn D. Jackson, Jr., reunion chairman, 54 Lenox Road, Summit, N. J.
- 1932 June 6-8. Curtis Hotel, Lenox, Mass. Thomas E. Sears, Jr., reunion chairman, Park Square Building, 31 St. James Avenue, Boston 16.
- 1937 June 6-9 (morning of Alumni Day). Weekapaug Inn, Weekapaug, R. I. Philip H. Peters, reunion chairman, 14 Cushing Road, Wellesley Hills 82, Mass.
- 1942 June 7-8. Hotel Griswold, New London, Conn. Charles A. Speas, reunion chairman, 17 Crown Ridge Road, Wellesley 81, Mass.
- 1947 June 6-8. Cliff Hotel, Scituate, Mass. James L. Phillips, reunion chairman, Masconomo Street, Manchester, Mass.

For additional information and the latest details please consult the class secretary or the reunion chairman, so that you may make satisfactory arrangements for attendance at your reunion.

Price Named Term Member

GWILYM A. PRICE, President of Westinghouse Electric Corporation since 1946, has been elected to term membership on the Corporation of the Institute until June, 1956, according to President Killian.

Born in Canonsburg, Pa., Mr. Price received his bachelor of laws degree from the University of Pittsburgh in 1917 and was admitted to the Pennsylvania bar in the same year. He practiced law in Pittsburgh after serving in World War I as a captain, 302 Heavy Tank Battalion, United States Army.

From 1920 to 1922 he was assistant trust officer at the Pittsburgh Trust Company, and from 1922 to 1943 he was associated with the Peoples-Pittsburgh Trust Company, successively as trust officer, vice-president, vice-president in charge of trusts, and president and director. In 1943 he became vice-president of the Westinghouse Electric and Manufacturing Company. Mr. Price is also a trustee or director of a number of bank, business, and insurance companies and a member of prominent professional and social clubs.

Council Doings

CONTINUING the trend of high attendance which has marked all Council meetings of the current year, 115 members and guests were present at the 287th meeting of the Alumni Council which was called to order by Alfred T. Glassett, '20, President of the Alumni Association, on February 25 in the Campus Room of the M.I.T. Graduate House.

Raymond Stevens, '17, offered the recommendations of the Committee on Resolutions for the late C. Adrian Sawyer, Jr., '02, which were unanimously adopted by a silent rising vote. C. George Dandrow, '22, has been named to fill the unexpired term of Mr. Sawyer on the Audit and Budget Committee.

As an item of business reported by Donald P. Severance, '38, Alumni Secretary, the Council learned that 26 members of the Institute's Faculty or staff visited 21 alumni clubs between January 8 and February 20 — from San Juan to Bangor, and from Seattle to Los Angeles.

The Executive Committee endorsed the following persons to serve on committees for Alumni Day which, this year, will occur on Monday, June 9: George Warren Smith, '26, general chairman; George W. McCreery, '19, cochairman; *Banquet Committee*: William H. Carlisle, Jr., '28, chairman, Donald W. Kitchin, '19, Clarence R. Westaway, '33, Robert M. Becker, '34, Russell Hastings, Jr., '34, Rogers B. Finch, '41, Richard J. Zeamer, '43, Albert B. Van Rennes, 10-44, Harl P. Aldrich, Jr., '47, and Stanley J. Marcewicz, '51; *Luncheon Committee*: Theodore T. Miller, '22, chairman, Alan W. Burke, '20, George W. Knight, '24, Chenery Salmon, '26, Frederick B. Grant, '39, Oswald Stewart, 2d, '39, John L. Danforth, '40, Theodore P. Heuchling, 2-46, and Donald A. Hurter, 6-46; *Committee on Departmental Reunions*: Julius A. Stratton, '23, chairman, Kenneth R. Wadleigh, '43, and Norman C. Dahl, '50; *Ladies' Events Committee*: Mrs. John B. Wilbur, chairman, Mrs. Walter H. Gale, Mrs.

Murray P. Horwood, '19, Mrs. Ralph T. Jope, Mrs. James R. Killian, Jr., Mrs. Robert M. Kimball, Mrs. George W. McCreery, Mrs. Theodore T. Miller, Mrs. George Warren Smith, Mrs. Avery H. Stanton, and Mrs. Julius A. Stratton; *Registration Committee*: Wolcott A. Hokanson, Staff, chairman, G. Edward Nealand, '32, and Robert E. Hewes, '43; *Transportation Committee*: Emmons J. Whitcomb, '11, chairman, and Malcolm S. Stevens, '34.

Henry B. Kane, '24, Director of the Alumni Fund, in his progress report mentioned that we have now passed the halfway mark of our solicitation year. Two additional mail solicitations are to be made: one now in progress; the last, in May. The total contributions of \$131,500 represent about 60 per cent as many contributors as last year's final total and 80 per cent of the final amount. The present average contribution of \$23 is the highest of any year.

The evening program opened with remarks from President Killian and Dr. Compton. President Killian specifically mentioned the dinner (held on February 15) of the M.I.T. Club of New York at the Waldorf Astoria where a New York Club award of a silver stein was presented to Lester D. Gardner, '98. To illustrate the Institute's needs for additional scholarship endowment, President Killian discussed the three figures of average scholarship aid per student enrolled; \$33 for engineering schools; \$55 for M.I.T.; \$123 for liberal arts colleges. And, lastly, President Killian read a letter from the Superintendent of the Boston State Hospital mentioning the work done at the hospital by the pledges from one of the fraternities in lieu of the conventional Hell Week practices.

Dr. Compton spoke interestingly of the type of problems that come to him in the course of a day. He closed his remarks by praise of the extraordinary diligence of those who had been charged with the responsibility of selecting a new Dean of Students, spoke of the qualifications which had been required, and cited unanimity of opinion behind the selection of E. Francis Bowditch as Dean of Students, introducing Dean Bowditch as the next speaker.

Dean Bowditch spoke of his impressions of the responsibilities of the Dean's Office at M.I.T. and of the challenge of individualizing the process of bigness in our own educational institution. In particular, he referred to the inclusion of spiritual education as part of the education of the whole man and cited many examples indicating a growing sense of responsibility for the well-rounded education of the M.I.T. undergraduate.

The final speaker was Professor Charles S. Draper, '26, Head of the Department of Aeronautical Engineering, who spoke about automatic control of aircraft, including guided missiles. Following the trend for aircraft to be built with less and less dependence upon human supervision, Professor Draper predicted that automatic control of aircraft would leave the pilot with less and less to do in the future. He also discussed the problem of automatic control from the point of greater safety. Professor Draper concluded by referring to the need in the future for training aeronautical engineering students to think in terms of instrumentation of aircraft as well as the conventional structures, aerodynamics, and power plant.

Donald C. Stockbarger: 1895-1952

DONALD C. STOCKBARGER, '19, Associate Professor of Physics at M.I.T., died at his home in Belmont on February 23. Professor Stockbarger was internationally known for his development of the first optically usable laboratory-grown fluoride crystals ever obtained. He also developed apparatus and a method for growing oriented sodium nitrate crystals of optical quality.

Born in Walkerton, Ind., on October 19, 1895, Professor Stockbarger received the degree of bachelor of science from the Institute in 1919 and the degree of doctor of science in 1926. He joined the Department of Physics as an assistant in 1920 and became an instructor in 1923, an assistant professor in 1927 and an associate professor in 1935.

In the past Dr. Stockbarger has delivered lectures under the auspices of the Society of Arts at the Institute and contributed valuable articles in the pages of *The Review*. He was a fellow of the American Academy of Arts and Sciences.

Sloan Fellowships

PLANS for a nationwide competition for 14 Sloan Fellowships, entitling recipients to participate in the executive development program at the Institute, have been announced by E. P. Brooks, '17, Dean of M.I.T.'s new School of Industrial Management.

The fellowships are awarded to outstanding young executives under a program which was established more than 20 years ago by grants from the Alfred P. Sloan Foundation. The program covers a year of advanced study in economics and business administration at the Institute to prepare men for higher executive responsibility.

In announcing the 1952 fellowships, Dean Brooks said:

This executive development program offers unusual opportunities for supplementing the practical industrial experience in the development of unusually able young men towards positions of higher responsibility in industry. This program, initiated at M.I.T. over 20 years ago, will now become part of our new School of Industrial Management. This school, made possible by a generous grant of funds from the Alfred P. Sloan Foundation, Inc., represents a substantial expansion in M.I.T.'s service in developing leaders for the benefit of industry and our total industrial society. We find that men already tested and tried in industrial experience can benefit to an unusual degree from an opportunity to broaden their understanding and to re-evaluate their own viewpoints concerning the complex problems facing industry today.

Nomination by an employer is a prerequisite of application for a Sloan Fellowship, since employers co-operate in the program both by sponsoring outstanding young men and by providing successful candidates with a year's leave of absence. Fellows are drawn from both large and small companies in various types of industry. They will participate in a special program of seminars, classes, and field investigations aimed at increasing their technical managerial skills, and at deepening their understanding of the social and economic implications of their work.

Adapting Mechanics to Change

THE Visiting Committee on the Department of Mechanical Engineering* met on December 15, 1950, under the chairmanship of Frederick S. Blackall, Jr., '22. The morning was devoted to visiting the metal-cutting and machine-tool laboratories; the afternoon and evening to discussions of departmental problems. The Committee commended in highest terms the work of the Department. It was especially impressed with the forward-looking attitude of Professor C. Richard Soderberg, '20, Head of the Department of Mechanical Engineering, and his associates.

During its 1949 meeting, the Committee had given extended consideration to the lack of sufficient choice in the professional electives for seniors. To meet this objection, a modification of the curriculum, in two stages, has been effected. The first stage, starting with the academic year 1951-1952, will provide for approximately 54 units of elective time in the fourth year of study.

The professional electives have been arranged in a large number of preferred groupings, designed to illustrate basic principles and methods of thought, and to arouse a maximum of enthusiastic interest on the part of the student. Certain of the professional subjects, such as Metals Processing 3.12, Strength of Materials 2.081, and Heat Engineering 2.43, will be mandatory only if included in one or another of the elective groups. Pursuant to recently promulgated Institute policy, opportunity will also be afforded for additional elective subjects in the humanities. The new elective system will make it possible for Course II students to give added attention to management problems, and will also facilitate the introduction from time to time in the future of new professional fields, such as nuclear power.

The second stage of transition concerns the second and third year curricula. Effective in the academic year 1952-1953, the requirements in Applied Mechanics and Fluid Mechanics will be reduced, thereby restoring the balance between these subjects and Thermodynamics. The second term of Machine Tool Laboratory 2.852 will be moved into the third year, when a more mature professional presentation can be made. The new curriculum also includes additional material in the form of a synthesis of electrical and mechanical engineering subjects, more effectively merging the two points of view.

The Committee was much interested in the Department's new plan for laboratory instruction. A generation ago, the Steam Laboratory occupied a pre-eminent place in the curriculum. Instruction was focused almost wholly upon the subject of power, then relatively new and vital. Industrial trends of the past 20 years have reduced the typical laboratory course to small dimensions; too often the latter has threatened to degenerate into a superficial coverage of outmoded subjects through stereotyped exercises. This challenge to effective laboratory instruction has been met through inclusion in these courses of up-

to-date material, confronting the student with problems of current interest which will develop skill and judgment in the application of engineering measurements of present-day importance. The Committee supports these developments and anticipates promising results.

In co-operation with the School of Architecture, and the Department of Business and Engineering Administration, the Mechanical Engineering Department inaugurated experimentally a course in Industrial Design, intended to acquaint the student with some of the basic tenets of this field of engineering activity. Regular classroom instruction has been supplemented extensively by outside lecturers selected from active leaders in the field. The students' response to this program has been outstanding. Inaugurated as one phase of the revitalization of instruction in Machine Design, which has been in process for some time, this new course will broaden that field to embrace commercial, aesthetic, and production factors.

The Co-operative Course in Mechanical Engineering, known as II-B, has been functioning since 1948 and the Committee is gratified with the results obtained thus far. In 1950 about one quarter of the junior class was enrolled in this program, which seems to meet particularly well the needs of mechanical engineering students. The Committee has followed this development with much interest and emphasized the advantages of the six months' uninterrupted tour of duty at the plant in contrast with the three months' summer job.

The Committee considered at some length the relative significance of graduate and undergraduate work. During the past decade, the number of graduate students in Mechanical Engineering has approximately doubled, but this is but an inadequate index of the real growth of the Department in the field of post-graduate instruction. The graduate student of today has vastly greater opportunities than those of his counterpart, 10 years ago. By way of example, consider the growth of research in the field of materials, where the program is now unusually extensive and includes joint activities with the Department of Metallurgy in Metals Processing.

Up to the present time, it has been relatively easy for the Department to enroll superior students in the Graduate School, but this situation may change as the Defense Program develops. While the Committee does not recommend any change in the relative emphasis on graduate and undergraduate activities, it does believe firmly and unequivocally that our educational standards must be maintained on the highest plane for the undergraduate, as well as the graduate, school.

The Committee felt that the steps which have been taken toward the improvement of the curriculum represent real progress in the direction of the ideal program for complete and well-rounded training of the engineers of the future. The task is to adapt Mechanical Engineering instruction to changing conditions and requirements without ever losing sight of the importance of fundamentals. The Committee believed that responsibility for this task was in strong hands in the Mechanical Engineering Faculty.

(Concluded on page 312)

* Members of this Committee for 1950-1951 were: Frederick S. Blackall, Jr., '22, chairman, Redfield Proctor, '02, Andrey A. Potter, '03, Max L. Waterman, '13, Thomas H. West, 3d, '22, Alexander C. Monteith, and Lewis K. Sillcox.

BUSINESS IN MOTION

To our Colleagues in American Business...

Substitution of materials is of considerable concern to many manufacturers these days. Never before have we seen so much interest in the subject. However, it is by no means new to Revere, which has always held to the principle of recommending the metal that will best serve the customer. Thus, we have often suggested switching from one metal or alloy to another, with the object of lowering costs, increasing production, improving service, or all three.

When based on a detailed study of all the factors involved, substitution at times can be extremely valuable. In fact, the ever-increasing quality and service to be found in American products is due in part to the continued search for better materials, and their adoption when found. Better materials, better design, finer workmanship—these are part of American progress.

But there are instances, of course, when no practical substitute can be found, when only one material offers just the right combination of good qualities required for a given application. Take the automobile radiator. This has always been made of copper, because copper is the one and thus far only metal that perfectly meets all the requirements of manufacture and service. To make a radiator, very thin copper sheet and strip must be crimped, bent and otherwise formed. Copper's easy workability makes it ideal from the manufacturing standpoint. After assembly, the radiator is cleaned, and made water-tight by dipping in a bath of hot solder. Copper is exceptionally easy to solder. When in service on a car, truck or bus, the radiator must not rust, and must resist

corrosion by water and anti-freeze. Copper is notable for its resistance to corrosion in such use. The radiator must also cool the water by radiating its heat into the air stream; copper has the highest heat conductivity of all commercial metals. A copper radiator thus is the most efficient and durable. It should outlast the car unless accidentally damaged, and when the injury is not so great as to make replacement necessary, the nearest shop can make repairs easily.

Recently it has been suggested that automotive radiators should be made of aluminum. However, both copper and aluminum are temporarily in short supply, and therefore to substitute one for the other does not appear to be practical. Beyond that, we do not believe—based upon experience to date—that aluminum's qualities, fine though they are, necessarily make it suitable for automotive radiators. In addition, the difficulties of

retooling in the factory and repairs in the field must be considered. Revere fabricates both copper and aluminum, and we have reason to believe that our impartial advice to stay with copper for automotive radiators is concurred in by radiator manufacturers.

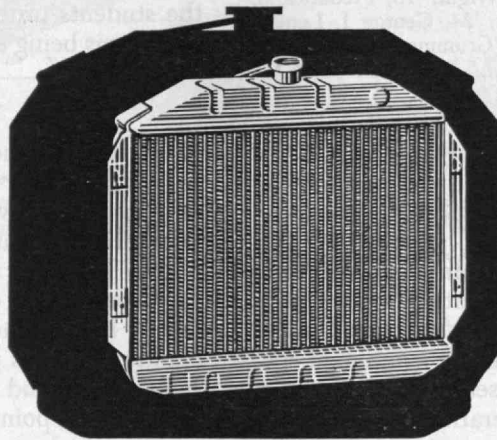
When you are tempted to substitute one material for another in your product, no matter what it may be, make certain you obtain all the facts as to costs, production, service. Your suppliers will be glad to collaborate with you in studying the effects of a proposed change. We suggest you take full advantage of their knowledge and experience.

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Flight Control

THE Visiting Committee on the Department of Aeronautical Engineering* met on May 7, 1951, and discussed the problems and activities of the Department with Professor Jerome C. Hunsaker, '12, and his staff. Although all members of the Committee were not unanimous in their views, the Committee made the following recommendations:

1. The Committee noted the difficulties of including, in a four-year undergraduate course for all, the subjects required to keep pace with modern aeronautical engineering developments and suggested that the four-year undergraduate course should be retained and that a five-year course should be provided for students who are financially able to take it.

2. The Committee recommended that the humanities should have a position of importance in engineer-

* Members of this Committee for 1950-1951 were: Luis de Florez, '11, chairman, Theodore P. Wright, '18, Frederick S. Blackall, Jr., '22, James H. Doolittle, '24, George J. Leness, '26, Preston R. Bassett, and Leroy R. Grumman.

NEW FRONTIERS IN SCIENCE

(Continued from page 296)

each did his essential part in the complex program of a modern technological development. What is new in our lifetime is the wherewithal to benefit from science. Especially important are the teams of competent specialists who can carry out the research, development, engineering, and pilot-plant operations, and provide the management skill for the organized effort. Dr. Fleming's discovery of penicillin would probably have meant little to human welfare if it had been made in 1850.

As another illustration of the mechanics of the process of utilizing science, consider the spectacular development of nuclear energy. This was an outgrowth of the work of both theoretical and experimental physicists, and stemmed largely from the discoveries of the 32-year period from 1887 to 1919. It was not until January, 1939, however, that Hahn discovered the formation of barium by the neutron bombardment of uranium. Recognized as nuclear fission by the refugee scientists, Frisch and Lise Meitner, the news of the German experiment was brought to this continent by Niels Bohr. Experimentally, nuclear fission was confirmed in four laboratories in three countries within a month of the first experiment in Berlin. The bomb development race was on.

The wartime history of the bomb project has been well described, in outline, if not in detail. Many scientists in Britain, Canada, and the United States were brought together to solve the remaining problems. Engineers designed processes for winning uranium from its ores. Teams of scientists and engineers developed methods for the separation of uranium iso-

ing education, but where conflicts exist, priority should be given to professional subjects.

The Committee recommended that additions be made to the curriculum as follows: (a) Studies to cover instrumentation necessary for the control of new types of high-speed aircraft and guided missiles, since such instrumentation has now become an integral part of their design; (b) The study of armament, which is an integral part of the design of aircraft for military purposes; (c) The study of helicopter and other rotary wing aircraft, which now constitute one of the major developments in aviation.

4. The Committee stressed the desirability of following the careers of the Department's graduates and preparing statistical data on the numbers who follow careers in various fields.

5. The Committee felt that there is a great need to attract competent engineering talent in Ground Aviation, which comprises airport design, ground navigational aids, communications, and the handling of passenger and cargo traffic.

The Committee was greatly impressed with the method of teaching instrumentation under Professor Charles S. Draper, '26, where it is the practice to give the students problems involving theoretical analyses of systems being experimented with in the laboratory.

topes, and engineers built the fabulous K-25 plant at Oak Ridge for this purpose. New towns were built and the plants were guarded by small armies. The two billion dollars spent to get the first few atom bombs indicates the magnitude of the undertaking. The complexity of organization and planning can hardly be imagined. Except for the invasion of Normandy, man has perhaps never in history completed such a large and complex undertaking.

Again my point is the powerful new tool — teamwork — which we have developed, in our time, for the purpose of utilizing scientific discoveries for something we think worth-while. Science, engineering, and production, working together, do what any one of the three would find impossible.

I know many brilliant and productive scientists, but I am not convinced that scientists as a group are more intelligent than other professional or business people. But scientists are peculiarly important in the scheme of things because the whole development process waits on their initial performance. They push the button that starts the machine. No Fleming, no penicillin — no matter how competent others may be. Because of this, it seems strange that industry does not provide more support for basic science.

The engineers and the rest of the team have learned to do a lot with a few scraps tossed by the scientist, and have seen some lean years. Faraday and Maxwell laid the basis for our electrical industry, but electrical engineers had to be content with little that was new until electronics began to develop two or three generations later. In the intervening 50 years, the electrical engineer, with nothing much more than Maxwell's equations, a few data on properties of materials, and a slide rule succeeded in developing our

(Continued on page 314)

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Another outstanding example of advanced power practice at sea is the fleet of eight ocean-going ore carriers operated by the Ore Steamship Company. This famous fleet, which maintains a regular schedule on an 8000-mile, round trip voyage between Sparrows Point, Maryland and Cruz Grande, Chile, is powered with the highest pressure boilers in marine service today—1450 pounds per square inch.

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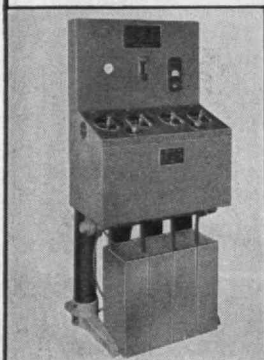
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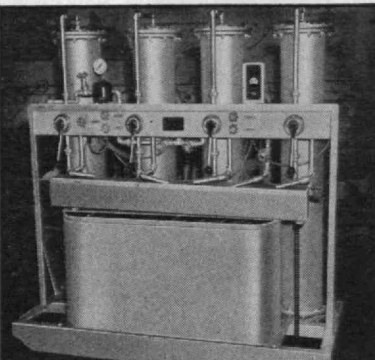
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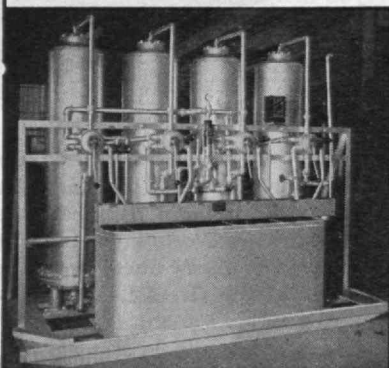
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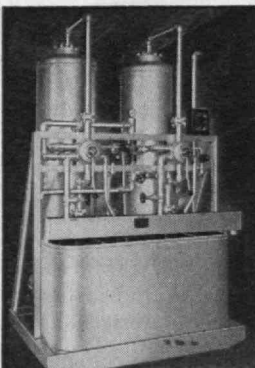
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NEW FRONTIERS IN SCIENCE

(Continued from page 312)

great light, power, and communications industries. Now the electrical engineer has a new lease on life, by virtue of the new scientific discoveries in electronics, including the very recent transistor development, which may make the vacuum tube obsolete.

The importance of the team effort of scientists and industrial technologists raises the question of why industry does not feed and keep their own scientists, so that the team can work together in one place. To a certain extent industry does this, but primarily it employs applied scientists and technicians. Basic or pure science thrives best when left alone, progressing by a sort of Brownian motion, in random directions determined solely by the curiosity of the scientist. The profit motive in industry does not encourage the employment of men who are allowed to do whatever they please. The universities have had the wisdom to do this, and the results have been spectacular.

Even in the early days of the scientific revolution, when science was not quite respectable in academic circles, such great men as Galileo, Copernicus, Paracelsus, and Newton were all professors. Nearly all of the important contributors to basic medical science, biology, chemistry, and modern physics were professors. In pure or basic science, university science is science. With a few notable exceptions, such as the Rockefeller Institute for Medical Research, it has been the universities which have supported science and scientists, providing the freedom of inquiry so necessary to scientific progress. Russia is now repeating the medieval experiment of dictating what scientists shall believe. Such a policy provides a most hopeful sign that Russian technology will not be able to compete with ours.

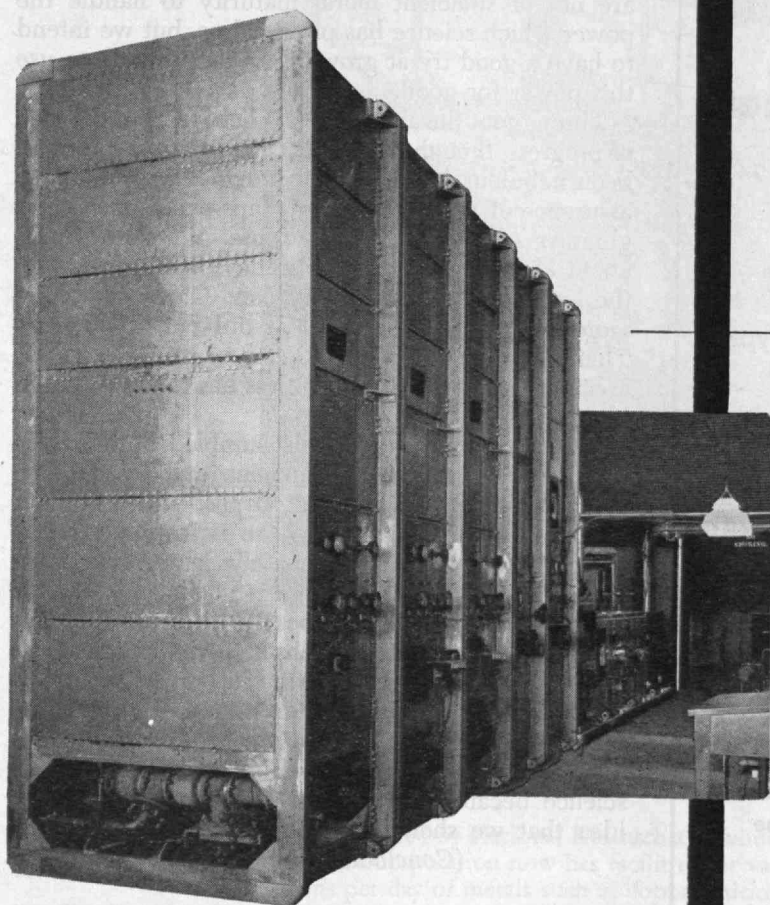
M.I.T. does not employ scientists in a sense of charity, but for the purpose of fulfilling its functions and obligations. These are the extension of human knowledge and the education of students. Even with inadequate research grants, first-class professors in science can hardly be kept away from research which extends human knowledge. Certainly they assist in the education of students in areas of increasing importance to everyday living.

But professors in the fields of engineering and science do something more which is extremely important. They are largely responsible for providing the creative atmosphere which is the university. Curricula confined to the teaching of facts, no matter how recondite the subjects, do not belong in universities. The research and creative activities of the staff, particularly in engineering and the sciences, give the student some sense of the thrill of creative accomplishment. I believe the creative atmosphere, and the ability to make students understand the meaning of creative accomplishment, are the basic differences between universities and the high schools.

Science — university science — has a proud record and clearly a brilliant future. It has provided man with the tools to do what he wishes to do, rather than what he is driven to do. It has removed the physical

(Continued on page 316)

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NEW FRONTIERS IN SCIENCE

(Continued from page 314)

obstacles to ethical and spiritual progress. As Karl T. Compton, chairman of the M.I.T. Corporation, has written: "Science has given us, for the first time in the history of the human race, a way of securing the more abundant life without taking it from someone else or working inordinately hard and long to get it."

It has been said that the results of science are morally neutral, neither good nor bad; that man determines whether they be put to good or evil use. The problem of nuclear energy, of course, challenges our willingness to use science for good and not for ill. But science is nothing but knowledge, and we have the deepest faith that knowledge is good and ignorance evil. Handing nuclear energy to our modern race may be like giving a lighted Roman candle to a baby; the result could be disastrous. Perhaps we are not of sufficient moral maturity to handle the power which science has provided us, but we intend to have a good try at growing up fast enough to use this power for good.

Throughout the ages, man has held faith in the idea of progress, though the evidence of progress has often been nebulous. Science now provides us with some assurance of progress, and perhaps even some slight glimmer of our ultimate purpose. We know more about electricity than did Faraday, and more about the human body than did Harvey. Clearly we have more power over nature than did our forefathers. There seems to be real evidence of progress in this area, and the concept of progress has taken on tangible meaning.

Through science man feels humbled both by the complexity of natural phenomena and by the evidences of order, pattern, and purpose which he finds in nature. At the same time, he is inspired by the thought that he may ultimately learn everything about nature, that knowledge is good, and that the ills of mankind will disappear if there is sufficient knowledge. The scientist senses, perhaps, that if he knows all about nature he will come to know God.

In any case, we have science, and we could not stop the accumulation of knowledge if we tried. The idle suggestion that there should be a moratorium on science because it can be used for evil is like the idea that we should stop steel production because

(Concluded on page 318)

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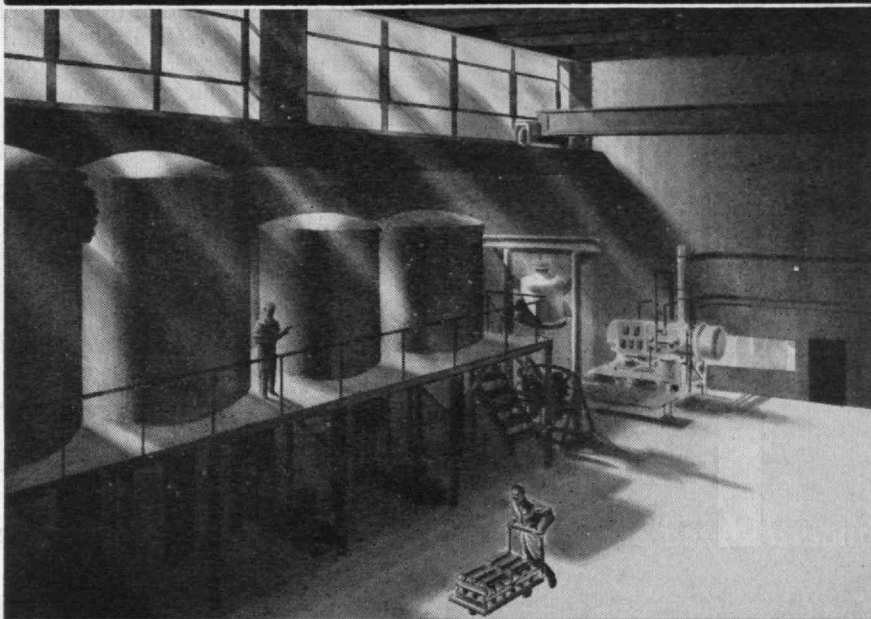
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Organized by National Research as a wholly-owned subsidiary, Vacuum Metals Corporation now has facilities for vacuum melting more than five tons per day of metals such as copper, nickel, molybdenum or iron.

Vacuum Metals Corporation joins the other companies created by National Research such as Minute Maid Corporation, the first to make quick-frozen orange juice concentrate, and Holiday Brands, Inc., the first to make crystalline soluble coffee.

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NEW FRONTIERS IN SCIENCE

(Concluded from page 316)

some steel goes into munitions. It is an affront to our intelligence, and to our faith that knowledge is good.

If the results of science are neutral, the methods of science are not without morality. Speaking of science and scientists, J. Robert Oppenheimer says the following:

There is [in science] a total lack of authoritarianism, which is hard to comprehend or to admit unless one has lived with it. . . . In science the worker learns the possibility of error very early. He learns that there are ways to correct his mistakes; he learns the futility of trying to conceal them. . . . We [scientists] learn that views may be useful and inspiring though they are not complete. We come to have a great caution in all assertions of totality, of finality or absoluteness. . . . We learn to throw away those instruments of action and those modes of description which are not appropriate to the reality we are trying to discern, and in this most painful discipline, find ourselves modest before the world. . . . If the professional pursuit of science makes good scientists, if it makes men with a certain serenity in their lives, who yield perhaps a little more slowly than others to the natural corruptions of their time, it is doing a great deal. . . .*

And finally, we have the words of Aristotle: "Search for the truth is in one way hard and another easy, for it is evident that no one can master it fully nor miss it wholly. But each adds a little to our knowledge of Nature and from all the facts assembled there arises a certain grandeur."

*"Physics in the Contemporary World," The Technology Review, 50:201 (February, 1948).

TELEPHONE SERVICE

(Concluded from page 303)

dormitory units. Upon receiving a call, the student goes to the nearest one of these corridor telephones, dials 0, gets the information operator, and asks for his call by name. Students make their outgoing calls from any one of the 42 conveniently located pay stations about the dormitories and the Institute.

In the near future, it is planned to install the fire alarm central office equipment in the room next to the switchboard. Upon hearing an audible signal indicating a box alarm, the chief telephone operator will read the box number and sound the fire alarm over the code call to alert the Institute's Buildings and Power people assigned to fire fighting.

Reporting of fire by telephone is to be done by dialing "100." This rings a bell in the Operating Room and causes a red lamp in the trunk multiple to light. The operator answers and talks with the person making the report, recording the details. The operator then operates the code call as in the case of a box alarm.

A brief statement of M.I.T.'s telephone traffic may be of interest. During recent months, these switchboards have been handling over 100,000 local calls a month and about 2,500 toll calls. The bill is currently running well over \$200,000 a year, in addition to the salaries of operators and the cost of directories.

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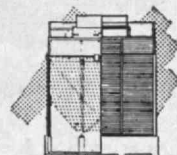
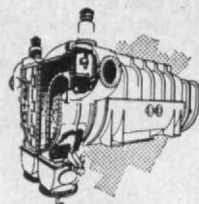
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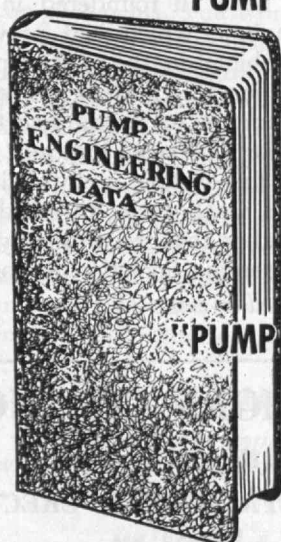
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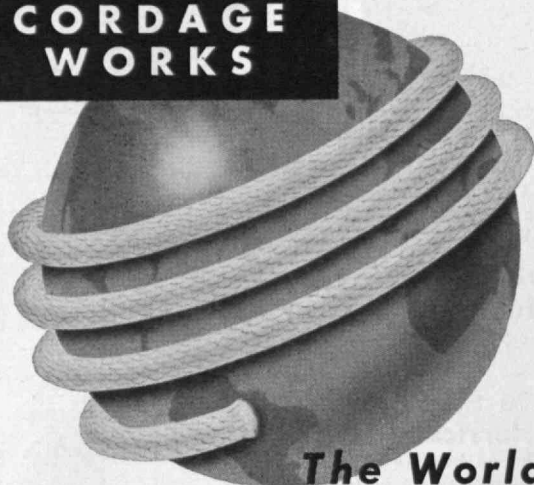
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ECONOMICS AT M. I. T.

(Concluded from page 306)

background that should make them useful in a wide variety of jobs.

This spring the Department of Economics and Social Science expects to move into the recently acquired Sloan Building along with the School of Industrial Management. Readers of this article are invited to come and visit us in our new quarters. We will show you our Industrial Relations Library and our Psychological Laboratory. We will tell you about the Scanlon Plan that is making a valuable contribution to the betterment of employer-employee relations. We will describe research projects under way and point with pride to a growing list of publications by members of the Department. We would like to discuss with you the plans we have for future development in psychology and political science. The reader may be interested in meeting some of the staff or in talking to groups of students and if he can bear it, we will also tell him about some of our trials and tribulations. And perhaps he may have something on his mind he would like to tell us. If so, we will gladly listen. Our new address will be 50 Memorial Drive.

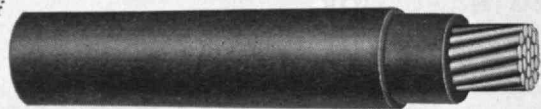
AUDIO ENGINEERING

(Continued from page 301)

by microphone placement and studio acoustics. Thus, the effective bass response will be raised by placing the double basses, cellos, and drums nearer the microphone, and a studio with excessive high-frequency reverberation will produce a shriller record regardless of what electrical system measurements show. For this reason, previous attempts to standardize recording have all foundered in practice. By using a technique which had previously answered a similar problem in the motion-picture industry, the Audio Engineering Society has recently found an answer. The idea is to standardize the response of the reproducing system so that any record which sounds good on this system, is, by definition, properly recorded. It is much easier to standardize reproducing systems rather than recording systems, and so the Audio Engineering Society's proposal of-

(Continued on page 322)

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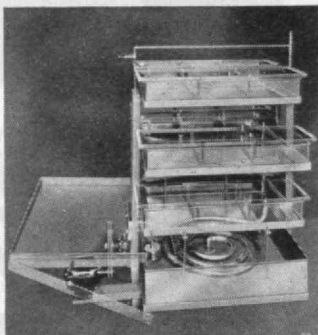


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AUDIO ENGINEERING

(Continued from page 320)

fers a practical means of solving an old problem. This standard is actually the more logical of the two courses, for we want to make it possible to reproduce all records with a single response adjustment and we care very little what the recordist does in order to enable him to produce a satisfactory result. The Audio Engineering Society proposal is an unusually happy one and has already been found very satisfactory even so early in its life.

The *Comité Consultatif International des Radio-communications* has recently proposed a recording characteristic for European discs which is a very close counterpart of the Audio Engineering Society proposal; in fact, each curve is within the tolerance of the other. As a result it is feasible to look for world-wide standardization in the future.

In disc recording, signals are recorded as lateral or vertical undulations in a groove, whereas in magnetic recording they appear as varying degrees of magnetization along the length of a strip of suitable material. The two methods are of almost equal age, for Valdemar Poulsen in Denmark worked with magnetic recording late in the last century. A useful technique for reducing the distortion and noise of a modern magnetic recording was invented by Carlson of the United States Navy in 1921. He applied an inaudible high-frequency voltage of constant amplitude to the recording head simultaneously with the signal to be recorded. The exact mechanism by which the improvement results is not rigorously agreed on, but there is no doubt that without such alternating-current bias technique, magnetic recording would not enjoy the benefits of its present wide acceptance.

Good quality sound recording is presently generally done on a magnetic tape rather than on a wire, for the latter suffers from the fatal paradox of being too thin for adequate strength and too thick for proper recording quality. It also poses the presently insuperable metallurgical problem of attaining exact uniformity of magnetic properties from one foot to the next. American use of wire for voice recording during World War II made special wire immediately available for postwar research, but the extravagant publicity claims for wire recording in 1946 and 1947 could not be fulfilled.

(Continued on page 324)

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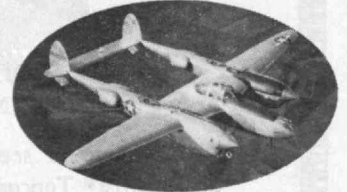
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AUDIO ENGINEERING

(Continued from page 322)

Postwar study of German wartime recording showed that they had rediscovered the alternating-current bias technique before we had, and that they had solved the quality-strength paradox by using a very thin layer of magnetic iron oxide on a non-magnetic plastic base of adequate thickness for strength. They simultaneously solved the problem of uniformity by making the oxide in large batches and mixing thoroughly before coating. Thus the material on one foot became an exact counterpart of that on the next, and only mechanical uniformity of thickness was necessary.

Intensive American research has developed oxides which are far superior to the German, as evidenced particularly by the improvement in frequency response. A good index to this is the available frequency range per inch of tape speed; the Germans achieved 330 cycles per second per inch per second, whereas we have already exceeded 2,000 cycles per second per inch per second. In doing this we have also improved the other index to performance, signal-to-noise ratio.

Even at 2,000 cycles per second per inch per second, a tape speed of seven and a half inches per second is needed to match the frequency range which discs provide, and the cost is rather high for home use. To overcome this, many home tapes are recorded with two tracks: the initial track is recorded along one edge; when the end is reached, the tape travel is reversed and the second track is recorded along the other edge of the coating. This halves the tape cost per minute of recorded sound, and the resulting loss in signal-to-noise ratio has proven too small to be objectionable. The same multiple track philosophy has been used in the intermediate-storage tape element used in digital computers, but many more tracks may be used.

Better Home Recording

High-quality home recording on lacquer discs was thoroughly possible in 1940, but the cost and mechanical skill required kept many from obtaining good results. Some very low-cost, home-recording equipment was available, but quality of result therefrom was so poor as to hinder sustained use.

(Continued on page 326)

William H. Coburn, '11

William F. Dean, '17

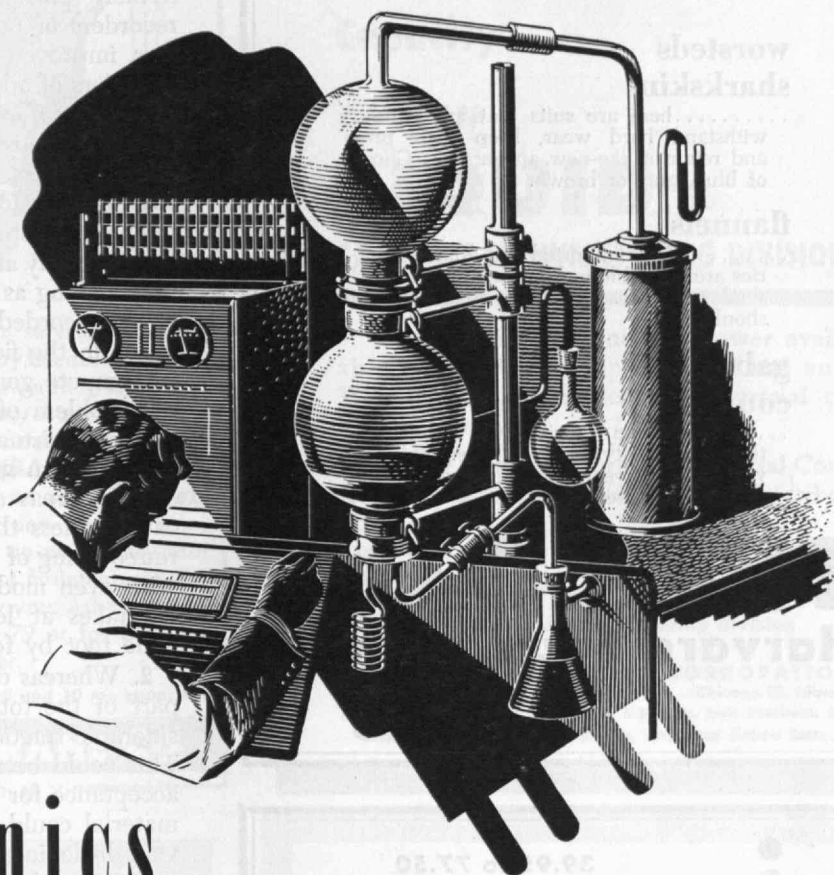
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AUDIO ENGINEERING

(Continued from page 324)

During World War II, American interest in magnetic recording led to the development of some extremely portable and relatively inexpensive wire recorders of poor sound quality. At the end of the war, improved wire was developed, and home wire recorders of adequate quality became available from many manufacturers. When magnetic tape became available, most engineering was concentrated on tape recorders, and so nearly all types of home machines made today use that recording medium.

The magnetic tape offers the user a record of adequate quality and fair compactness which may easily play as long as an hour. Thus we have the prospect of pre-recorded tape for the home, of particular interest in the field of classical music. If the tape is to compete generally with the disc, it must master the problem of mass duplication at minimum cost and with virtually no loss of quality of the original. The problem has resisted solution, for two reasons:

1. Whereas an hour of recording may be duplicated in less than a minute by pressing a disc, the re-recording of an hour of program material on tape, with even moderately presentable quality, at present takes at least a quarter hour, for it must be done foot by foot.

2. Whereas disc-pressing stock forms only a small part of the total cost of discs, tape cost is a considerable fraction of the cost of a pre-recorded tape. This could be reduced if there were general public acceptance for low-quality tape, for then lower cost material could be used. But, the public has shown very little interest in tape of substandard quality.

Someone has jokingly said that the cost for duplicating tape is proportional to the cube of the desired quality of sound. If this remains even partially true, then tape will price itself out of the home market, and the development of still longer-playing discs will be required. The present 10- and 12-inch long-playing discs do not represent the limit of what is feasible of achievement. For example, in 1948 the writer suggested that 50-minute recordings could be put on each side of a 16-inch disc, or 36-minute programs might be recorded on each side of a 13½-inch disc.

(Continued on page 328)

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AUDIO ENGINEERING

(Continued from page 326)

Present Status of Magnetic Tape Recording

Magnetic tape has invaded so many fields that it has become difficult to keep track of all new applications. Everyone knows of its use in home recording, in the broadcast station, and the recording studio, but these form only a part of the field today.

Educational applications have multiplied rapidly. Starting with equipment of rather poor quality, there has been steady upgrading, and today much equipment (particularly in the colleges) is fully professional in quality. Within the last few years it has been realized that the quality of professional equipment is essential for many educational applications, particularly speech correction, drama, and music, even for practice at home.

To Save Some Correspondence

An extended discussion of technical details of sound-reproducing equipment for use in the home would be out of place in the pages of *The Review*. Nevertheless the audio hobbyist always seems to crave advice. There are two places not to get this advice, and one place to secure it.

First of all, do not ask your friend, the recent graduate of the communication option in electrical engineering. He has suffered from a mixture of a rarefied brand of acoustical physics and a semivocational course in radio engineering. If he knows anything about making reproduced music sound better, it is strictly fortuitous. Secondly, do not ask this writer. Advice that does not satisfy the reader's aural taste is likely to do more harm than good, for there is no real way of transmitting aural preference by letter.

If you insist on spending your hard-earned money on home-music reproduction, the best method of choosing equipment is by listening tests in which you are the active participant. Most radio parts jobbers can set up, and select by means of push buttons, the various combinations of audio equipment which lie within your budget limits. A few minutes of critical listening to the different combinations should make one's preferences apparent. A somewhat longer listening period is preferable if your ear is poorly

(Concluded on page 330)

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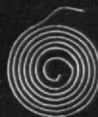
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AUDIO ENGINEERING

(Concluded from page 328)

trained, for certain fatigue effects take time to assert themselves to the untrained ear.

As in so many other fields, the results obtained depend on the money spent (which lies anywhere between \$100 and at least \$2,000). The pursuit of the ultimate is long, and the law of diminishing returns operates early. Nevertheless, it is safe to say that a mass-produced set, yielding even moderately high-quality results, will cost three to five times as much as a high-quality system bought from the jobber. For the very ultimate in results, no mass-produced set is available at all at present. Your jobber can supply a wiring sketch and a set of connecting wires cut to length and ready for use. Many will take care of adapting your own cabinet to the equipment if you wish, but you must do the installation yourself.

For 20 years it has been conventional to examine anything new for its social significance, and so perhaps we should examine audio. The most amusing thing is that the high-quality field seems to exist only on this side of the iron curtain; apparently it is very difficult to make good phonograph records behind the iron curtain. In fact, no one there has even claimed to have invented the record — an unfortunate omission for which someone will suffer.

More seriously, we have a widespread interest comparable only to the interest in radio in the 1920's, and leading similarly to widespread study of electronics as a hobby. In the 1920's this led to the introduction of a communications option in many electrical engineering courses. Now we see some student pressure for a reorientation of these courses, and more attention to the audio aspects of electronic engineering. In most cases this pressure has produced little result, and the commercial institutes have had to fill the gap.

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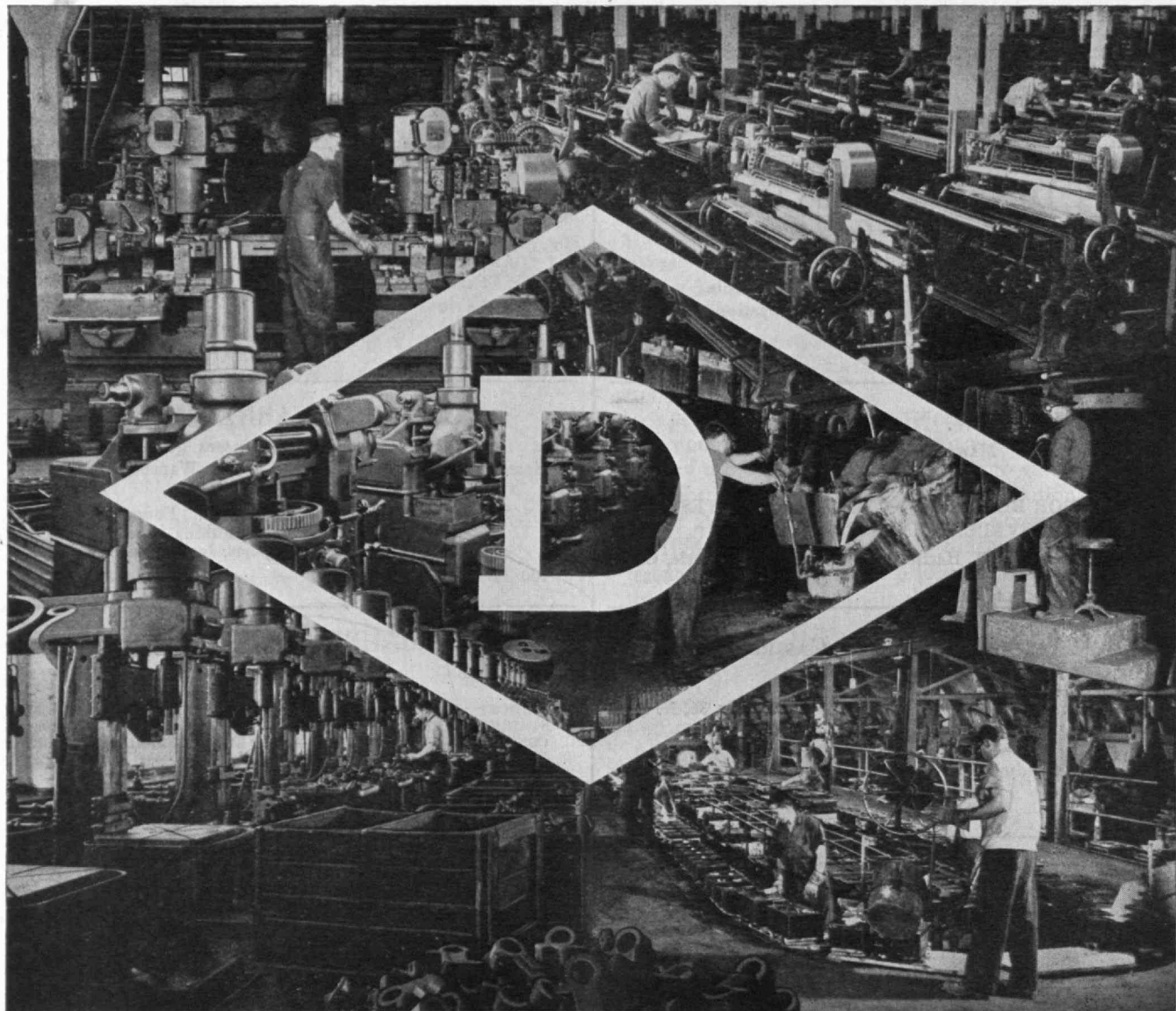
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Alumni AND Officers IN THE News

Success Stories

Three Technology men were honored by the Freedoms Foundation, when award winners were announced at the Foundation's annual Washington's Birthday exercises held at Valley Forge, Pa., in February. Recipients of the Freedom Awards from M.I.T. were ROGER W. BABSON'98, for his editorial, "Honest Socialists Discover Doctrines Fail to Work Out"; JOSEPH H. KEENAN'22, of the Department of Mechanical Engineering at M.I.T., for his article in *The Technology Review*, February, 1951, entitled "Education for Freedom"; and JAMES R. KILLIAN, JR.'26, Technology's President, for his valedictory address to the Class of 1950, "Our Shared Convictions" (reprinted in the July, 1950, issue of *The Technology Review*).

President Truman has appointed JEROME C. HUNSAKER'12, Head of the Department of Aeronautical Engineering at M.I.T., and JAMES H. DOOLITTLE'24, Vice-president of the Shell Union Oil Corporation, to a board which has been created to study safety control at airports across the nation—in view of the recent plane tragedies at Elizabeth, N.J. Dr. Doolittle will be chairman of this investigating board.

ARTHUR W. JOHNSON'14 has been promoted to the office of vice-president and secretary of the State Mutual Life Assurance Company.

ALFRED E. PERLMAN'23, formerly general manager of the Denver and Rio Grande Western Railroad, was appointed executive vice-president of the company early this year.

ROY G. RINCLIFFE'23 has been elected president of the Philadelphia Electric Company of Philadelphia, Pa.

MARTIN J. BUERGER'24, of the Department of Geology at M.I.T., has been chosen a foreign member of the Brazilian Academy of Sciences. The letter of election states that Professor Buerger has been chosen by the General Assembly in consideration of his "valuable contribution to science and most helpful collaboration with Brazilian research workers." Dr. Buerger has achieved widespread recognition for his developments of new techniques and instruments in x-ray experimentation and for application of x-rays to the study of crystalline solids.

The Glenn L. Martin Company of Baltimore, Md., announces the election of GEORGE M. BUNKER'31 as president and general manager of the company.

GEOFFREY BROUGHTON'36 has been appointed professor and chairman of the Chemical Engineering Department at the University of Rochester. Dr. Broughton had been chairman of the Department of Paper Engineering at Lowell Textile Institute.

The Mutual Security Agency, successor to the Economic Cooperation Administration, will use the services of CLINTON J. T. YOUNG'36 to help Italy modernize its electromechanical industries. Mr. Young is the first of the six American experts scheduled to go to Italy to assist Italian industrialists in setting up a modernization program.

Among those who received the Charles A. Coffin Award, highest honor attainable in the General Electric Company, was JAMES MILLER'43, a member of the metallurgical staff of General Electric's Thomson Laboratory in Lynn, Mass. Mr. Miller collaborated on a high-temperature metal testing project, the results of which were termed "the greatest technical advance" in the field in many years in the citation accompanying the awards.

MALCOLM S. MCILROY'47, Assistant Director of the School of Electrical Engineering at Cornell University, has been appointed assistant dean of Cornell's College of Engineering, effective July 1, 1952.

The Alumnus Speaks

On February 4, MAURICE E. STRIEBY'16 spoke before the Maryland chapter of the American Institute of Electrical Engineers on "Television Transmission."

CECIL BOLING'32 spoke at the monthly meeting of the Connecticut Valley section of the American Society of Refrigerating Engineers on February 14. His subject was "Trends in Finned Coil Design."

BURNHAM KELLY'41, Associate Professor of City Planning at Technology, spoke on "Prefabricated Houses" at the February 20 meeting of the Institute of Professional Town Planners in Toronto, Canada.

Written by and about

Featured on the cover of *Business Week* for February 9 is IRVING W. WILSON'11, President of the Aluminum Company of America. Mr. Wilson, in an article entitled "Alcoa is Rarin' to Go After Civilian Markets," is quoted as to his views on the present-day aluminum industry.

The *Reader's Digest* for February has condensed an article which describes "The Man with the Million-Dollar Nose," ERNEST C. CROCKER'14, a man "generally conceded to have the most expert and experienced human nose in the country." Mr. Crocker, who is at the flavor laboratory of Arthur D. Little, Inc., of Cambridge, is expert enough to discern 9,000 odors and in variations totally undetectable to the ordinary nose.

GIOCONDO GAGLIARDI'25 has written an article entitled "A Simple Way to Check Projection System Efficiency" for the Better Theatre Section of the *Motion Picture Herald*, February issue. Mr. Gagliardi,

until recently, has been a technical executive with Warner Brothers Theatres.

MILTON B. DOBRIN'36, senior research technologist of the Field Research Laboratories for the Magnolia Petroleum Company of Dallas, Texas, is the author of *Introduction to Geophysical Prospecting*, published by the McGraw-Hill Book Company, Inc. (1952).

E. GEORGE POLLAK'40, United States Navy, wrote "From Dover Straits to Corregidor Deep," for the February issue of the *United States Naval Institute Proceedings*.

DR. RITA M. KELLEY'41 has coauthored a two-part article, "Hormonal Treatment of Cancer," published in the January 24 and January 31 issues of *The New England Journal of Medicine*.

Papermaking in Pioneer America is the title of a new book written by DARD HUNTER, staff, Honorary Curator of the Dard Hunter Paper Museum at M.I.T. Described as "a truly fascinating book by a man who is the world's outstanding authority on the history of paper," it has been published by the University of Pennsylvania Press (1952).

Obituary

CHARLES D. JENKINS'82, February 6.
ALBERT F. BROWN'90, February 3.
CHARLES M. GAY'95, December 15.*
MILAN P. HARLOW'95, January 29, 1951.*
JAMES M. BROWN'97, January 14.*
HENRY C. GREENE'97, December 29.*
GEORGE P. SHUTE'01, December 29.*
GEORGE T. WILSON'01, January 2.*
ALBERT T. CHURCH'02, December, 1950.*
EDWIN E. KIMBAL'02, December 26.*
C. ADRIAN SAWYER, JR., '02, January 29.*
CHARLES S. WEBB'02, January 17, 1948.
AUGUSTUS C. FOSTER'04, December 31, 1950.

RUTHERFORD BINGHAM'07, January 3.
JOHN M. HATTON'09, January 30.
RAMON F. MUNOZ'09, November 3.*
KENNETH LEAVENS'10, December 20.*
JAMES R. CARPENTER'11, October 11.*
HAROLD R. L. FOX'12, August, 1951.
EARLE M. GIESIE'12, November 23.*
THOMAS B. LAWLER'12, December 25.*
OLIVER C. LOMBARD'12, February 10.
JULIUS GOTTLIEB'18, February 17.
DONALD C. STOCKBARGER'19, February 23.
DOUGLASS E. BROWN'21, January 4.*
HUNTER E. GARDNER'21, January 16.*
HARRY GILBERT'22, January 14.*
HUGH D. HALEY'22, February 8.*
J. STERLING KELLEY'22, December 8.
GEORGE D. RAMSAY'22, September 8.*
EDITH T. SEARS'22, summer, 1951.*
DONALD F. WARNER'22, February 12.*
JOHN J. MULROONEY'25, November, 1947.
IRVIN L. MURRAY'26, January 9.*
ALEXANDER G. SOUDEN'29, February 21.
RICHARD M. BURNS, 2-44, January 27.
JAMES H. THOMAS'48, August 12, 1949.
JAMES B. LEGRADIE'51, December, 1951.*
* Mentioned in class notes.

News FROM THE Clubs AND Classes

CLUB NOTES

M.I.T. Association of Cleveland

We've had our annual student luncheon and to those who missed it this year we send our regrets, since surely you would have enjoyed yourself and would have provided additional inspiration to the many students who spent two hours of good M.I.T. fellowship with us. Bill Gent '53, as master of ceremonies, did a fine job in introducing the men who gave us a firsthand report of the athletic and social side of Technology's current events. Bill Chandler '52, a former Lakewood High track star, as chairman of the Combined Musical Clubs, gave us a fine story of the Tech Show which apparently was a marvelous success this past year. To us, who have been out for more than several years, Bill mentioned that the '49 smash song hit, "Beaver-Beaver," was refeatured, and cautioned us to learn it as it will probably become one of the great all-time M.I.T. songs. John O'Donnell '53, a freshman scholarship student of two years ago, told us of the new building program, about which most of us are familiar; but to hear John was convincing evidence that the students see the necessity for additional plant facilities. Jerry Hathaway '52 assured us, in unqualified terms, that *Voo Doo* is still the outstanding Institute publication. He was possibly prejudiced but nevertheless refreshing in his enthusiasm for the part *Voo Doo* plays in Tech's "cultural" life. The staff of that journal must have put on an old-fashioned hot-stuff smoker. Times sure haven't changed. Royal Riedinger '54 spoke of intramural sports, which we all hope will continue to be strong. It was discouraging to hear that the bowling alleys at Walker were in poor condition. Perhaps some push can be made to restore them to the good shape in which I, at least, recall them. There appears to be a greater amount of organization in the intramural activities today. Certain social groups are beginning to develop a precedent for excellence in some particular sport as, for instance, S.A.E. Fraternity in basketball. Bill Deibel '55 had us right in the thick of Field Day again, and for a moment I was set to pounce on Jay AuWerter '38 on my right who, in 1938, had been a lowly frosh and I a lordly soph. The day was a honey with the glove fight settling the point score in favor of the freshmen. Mike Nacey '52 praised our intercollegiate sports program as drawing a high degree of participation without the single-purpose drive to concentrate on a winner. Those in attendance were: D. A. Reed (Yale guest student), R. W. Bell, Jr., '52, W. P. Chandler '52, R. H. Ehler '52, J. M. Hathaway '52, A. F. Hofstatter '52, Michael Nacey '52,

W. A. Gent '53, C. R. Hunt '53, J. R. O'Donnell '53, R. W. Chamberlin, G., W. L. Hartrick '54, R. C. Riedinger '54, P. H. Spengler, G., Helen Dugar '54, W. T. Deibel '55, D. B. Evans '55, A. R. Glueck '55, F. R. Morgenthaler '55, A. L. Zuker '55, A. A. Gould '10, C. L. Dows '12, W. J. Winninghoff '14, W. C. Brown '16, C. H. Reed '20, W. G. Loesch '21, A. I. Bradley '21, H. H. Spengler '22, F. H. Wood '22, R. H. Smith '23, C. E. Herrstrom '24, W. H. Robinson, Jr., '24, W. C. Sessions '26, H. M. Bush '26, E. E. Staples '26, F. E. Rhinehart '27, H. P. Ferguson '27, V. W. McDaniel '29, R. H. Valentine '33, G. E. Merryweather '34, H. A. Zimmerman '37, G. R. Young '37, F. W. Reuter '38, J. B. Scalzi '40, W. R. Stern '40, W. M. Folberth '41, L. D. Smith '41, C. H. Smith, Jr., '42, J. S. Ewing '42, R. J. Fay '42, C. M. Simpson, 10-44, V. R. Murphy '49, G. P. Loomis, Jr., '49, R. L. King '49, J. H. Morgenthaler '51, and A. L. Zesiger '51. — G. RICHARD YOUNG '37, *Secretary*, The Weatherhead Company, 300 East 131st Street, Cleveland 8, Ohio.

M.I.T. Club of Milwaukee

As planned, our holiday luncheon for M.I.T. students home from Technology was held on December 27 at the Wisconsin Club, with some 15 members present, among whom were: George Anderson '24, Jack Ballard '35, Frank Briber '43, Phil Cristal '17, Maurice Crowell '24, Fred Gruner '41, Arthur Hall '25, Arnold Jakel, 2-44, Harold Koch '22, Chester Meyer '36, John Monday '51, Dr. L. D. Smith '06, Emerson Van Patten '24, William Wallace '51, and W. O. Wright '34. All of the members were gratified with the excellent student representation, made up of the following guests: Michael Alexander '53, Herbert Arndt '52, Robert Cotton '53, Richard Crowell '53, Dean Karnopp, John Lindenlaub '55, Glen Maxon '52, Fortney Stark '53, Herbert Voss '50, Keith Johnson '51, Carl Scheid '53, and Francis Hyson '52. Our Vice-president, Jack Ballard '35, presided in the absence of Mike Biancardi '40 and called on several members for remarks. Dr. Smith '06 described the meaning and purpose of our M.I.T. Club of Milwaukee; Harold Koch '22 and Phil Cristal '17 emphasized the desire of the local alumni group to assist M.I.T. graduates and undergraduates in finding employment; and George Anderson '24 briefly mentioned the work of the Educational Council, still in its formative stages.

On February 8, the Club met at the University Club in Milwaukee with C. Stark Draper '26, Head of the M.I.T. Aeronautical Engineering Department, as the principal speaker, and with about 15 representatives of local schools as club guests. Dr. Draper's talk was well received by members and guests alike, and a question and answer period which followed had to finally be called to a halt. Our Club President, Mike Biancardi '40,

presided, and Jack Ballard '35 acted as moderator during the discussion that took place. George Anderson '24, in a few words, reviewed for the group the ultimate purpose of the newly formulated Educational Council. Because of Dr. Draper's work with the local A-C Spark Plug Division of General Motors Division, eight of its personnel were present through the courtesy of Joe Kripke '40. Our club members attending were: George Anderson '24, Jack Ballard '35, W. A. Bednar '50, M. F. Biancardi '40, W. R. Bohlman '49, Frank Briber '43, J. B. Cobb '37, Phil Cristal '17, Louis French '10, Fred Goelzer, 2-46, Fred Gruner '41, Arthur Hall '25, Kenneth Holmes '51, Harland Huston '45, Arnold Jakel, 2-44, Maurice James '27, Harold Koch '22, Joseph Kripke '40, Martin Kuban '37, Chester Meyer '36, John Monday '51, George Schultz '51, Emerson Van Patten '24, and William Wallace '51.

Activities for the rest of the year include a regular meeting, perhaps in April, for election of officers, a spring dance to take the place of our cancelled St. Valentine's party, and our annual picnic. — EMERSON J. VAN PATTEN '24, *Secretary*, 6160 North Kent Avenue, Milwaukee 11, Wis.

M.I.T. Association of Minnesota

The Association had its annual winter dinner meeting on February 6 at the St. Paul Athletic Club. The guest of honor was C. S. Draper '26, Head of the Instrumentation Laboratory and Aeronautical Engineering Department at M.I.T. Professor Draper, who was on the homeward leg of a three-week tour through the West, discussed the similarities and differences between aircraft designed by man and those devised by nature. Taking the bird as a convenient example of the latter, he showed the correlation between the two types as regards structures, aerodynamic form, and power plants, and pointed out that, in addition to common attributes, the man-made aircraft requires built-in intelligence in order to make it functionally comparable. The fabrication of this intelligence is, of course, the type of work that has made the Instrumentation Laboratory famous. Dr. Draper had the opportunity to renew several old friendships, especially that of his onetime student, Dean Athelstan F. Spilhaus '33, of the Institute of Technology, University of Minnesota.

About 25 members attended the meeting, which was preceded by a short social hour, and heard from Willis R. Salisbury '12 the latest details on the setting up of an M.I.T. Educational Council in the Twin City area. Club President Ken Lucas '32 presided. — JOHN J. RUDOLF, JR., '48, *Secretary-Treasurer*, Minneapolis-Honeywell Regulator Company, 2600 Ridgway Road, Minneapolis 13, Minn.

The M.I.T. Club of New York

Friday night, February 15th, will long be remembered by those attending our Silver-Stein Award Dinner. Approximately 400 Alumni and their wives had a most enjoyable and successful evening. The purpose of the dinner, to present the Silver-Stein Award to the outstanding Alumnus chosen by the Club, was outlined in last month's notes. Lester Gardner '98 lived up to expectations with the most gracious and delightful acceptance of the award. The stein was properly christened with champagne as Mr. Gardner toasted Dr. and Mrs. Compton, Dr. and Mrs. Killian, Mrs. Gardner, the Class of '98, and, last but not least, the Faculty of M.I.T. There is little wonder why the M.I.T. Club of New York was so successful when Mr. Gardner was active.

President Killian '26 gave us a brief state-of-the-union message. It was very encouraging to the Alumni to hear of our present strong financial status and the increasing emphasis being placed on studies other than engineering. President Killian emphasized that we have only one quarter of the funds available that liberal arts schools have for scholarships. Our main speaker, Bill Foster '18, Deputy Secretary of Defense, gave us a clear and concise account of what the Defense Department is doing. He pointed out that it is by far the largest business enterprise in the world and, based on civilian standards, is very efficient. There is a great need for trained engineers in Washington, and Mr. Foster asked that we do what we can to help the government get the men they need to fill this void.

There were many notable Alumni attending in addition to the honored guests. President Harry S. Rogers of Brooklyn Polytechnic Institute and General Jimmy Doolittle '24 were two of many. Socks Kinsey '24, chairman, and his committee are to be congratulated again for the work in making it a successful and memorable occasion. President Joe Littlefield '17 and Pete Grant '35 are to be thanked for their assistance. Pete Grant spent a week in the Maine woods just to record for posterity what the beavers thought of Mr. Gardner's idea to use them as the M.I.T. mascot. — RALPH C. WILTS '41, *Secretary*, American Blower Corporation, 50 West 40th Street, New York, N. Y.

M.I.T. Club of Northern California

A score and a half of Alumni and their wives gathered at Villa Chartier Restaurant in San Mateo to bid welcome to visitors from Cambridge. Our guests included Professor C. S. Draper '26, Head of the Aeronautical Engineering Department, Richard H. Bolt, Director of the Acoustics Laboratory, Walter H. Gale '29, *Secretary* of the Institute, and Don Severance '38, *Secretary* and *Treasurer* of the Alumni Association.

Professors Draper and Bolt, who had been principal speakers at the M.I.T. Regional Conference held in Los Angeles on January 26, gave short talks. Professor Draper spoke about the development in aeronautical engineering, wherein the

trend is toward the installation of facilities giving planes the humanlike qualities of brains and nerves, while Professor Bolt spoke about discoveries by acoustical research of the effects of sound upon the human brain and nerves. Walter Gale mentioned recruiting problems at M.I.T. and of the program to acquaint high schools throughout the country with M.I.T. and its opportunities. He also expressed concern over the imminent shortage of engineers in the years to come.

Captain A. B. Court '10 presided over the meeting; G. B. Hulet '34 made the arrangements; and Bert O. Summers '34 sent out the notices. The following Alumni were present along with their wives: George D. Whittle '08, E. J. Riley '09, A. B. Court '10, John J. Rowlands, J. K. Heller '16, H. P. Etter '20, J. H. Cox '23, C. S. Draper '26, R. E. Paine, Jr. '27, P. I. Cole '27, R. L. Cheney '27, Walter H. Gale '29, Philip Howe '30, J. H. Arnold '31, R. W. Hamilton '31, Bert O. Summers '34, G. B. Hulet '34, William O. Thompson '35, L. H. LaForge '37, D. P. Severance '38, J. A. Chartz '39, W. M. Chance '39, R. E. Keyes '40, C. E. Moffet '41, J. A. Stern '41, William D. McGuigan '42, William C. Kaesche, 2-44, A. C. Saer '43, and C. W. Holzwarth '49.

Newcomers and old-timers are reminded that the Club meets informally for lunch every Tuesday at noon on the mezzanine, New Delmonico Restaurant, 328 Sutter Street, San Francisco. Alumni in the Bay Area who are not receiving notices of dinner meetings should contact the Secretary or Assistant Secretary by post card or call Landscape 4-3337. — BERT O. SUMMERS '34, *Secretary*, 1740 Broadway, San Francisco, Calif. RAYMOND E. KEYES '40, *Assistant Secretary*, 1706 Jaynes Street, Berkeley 3, Calif.

M.I.T. Club of Northern New Jersey

On February 4, the Board of Governors and officers of the Club and their wives held a reception in honor of R. A. Vogeler '37, Assistant Vice-president of the International Telephone and Telegraph Corporation, at the Hotel Suburban, East Orange, N.J. This was followed by a dinner meeting attended by 161 members of the Club, wives, and guests, at which Mr. Vogeler gave a vivid description of his experiences with Red justice behind the Iron Curtain. Mr. Vogeler described how he was shadowed, his mail, luggage, and telephone calls checked, and his every move and contact reported. He told how he was arrested on November 18, 1949, while driving from Budapest to Vienna and taken to the headquarters of secret police in Budapest (known as the official torture house) located on Stalin Street. He was grilled with relentless questions for over 70 hours and forced to write and rewrite the autobiography of his movements and trips to Hungary covering a period of 12 years. During the grilling he was not allowed to sleep, had no sustenance except coffee with stimulants, was beaten and brutally treated, and dumped into ice water.

The Communists tried to force him to confess to sabotage, material shortages,

work stoppages, and failure to meet production goals in the Hungarian subsidiary of his company which had already been taken over by the Communists. They finally concentrated on a confession of sabotage. He was allowed a short period of sleep on a cot and then taken before the head of the Hungarian secret police who offered him comfort and a chance to live in any Communist-dominated country of his choice if he would implicate the United States in conspiracy against Russia. Later he was led to a room with four chairs and endured 12 days of questioning for periods of 18 hours or more per day by relay teams of Communists. They asked the same questions repeatedly, offered little food, no bathing facilities, and forced him to rewrite his autobiography; also his captors wrote 20 different confessions which they tried to make him sign. Mr. Vogeler was then placed in a cell, six by eight feet, containing a wooden bed three inches off the floor, with a wooden pillow elevated to make him face the door, over which a strong light was mounted and directed on his face. He spent 10 days there, never in darkness. The walls sweated, and the floor was covered with water. There were no sanitary facilities and the noisy cell door was opened every six minutes. The diet was black bread and water. This treatment destroyed all will and hope.

A political court trial was held at which 80 witnesses were beaten, tortured, and forced to implicate him and recite false accusations. After the trial he was taken to a special prison with picked guards. Cut off from the world, he was not allowed to speak and communicated with his guards by hand signals. Guards peered at him constantly through peepholes in the door. The cell was small, filthy, and lacked sanitary facilities. Food consisted of dried vegetable mush, water, very little meat, black bread, milk, and substitute coffee — all of inadequate quality and quantity. Once a month he was given a stub of a pencil and paper to write a letter to his wife, but these letters were never mailed. After six months confinement, he was given unrelated volumes of Thackeray and Dickens and speeches of Stalin. He was also given a copy of the Bible which was published by the British Bible Society. At the end of 17 months of imprisonment he was advised of his release one hour before he was removed from prison and was reunited with his wife and family in Vienna. Mr. Vogeler is grateful to the American press and his wife for their efforts in obtaining his release and return to freedom. He stated that he was shocked at the terms of his release and offered suggestions and actions that the United States might have taken following his arrest which would have forced his release. Upon completion of his talk, Mr. Vogeler gave enlightening answers to questions raised by the members.

The next meeting was a smoker, held the latter part of March. Donald H. Spitzli '27 was appointed to the Board of Governors to fill the unexpired term of a former member — ALBERT C. FAATZ, JR., '37, *Secretary*, 22 Midland Boulevard, Maplewood, N.J. RUSSELL P. WESTERHOFF '27, *Assistant Secretary*, 823 East 23rd Street, Paterson, N.J.

M.I.T. Club of St. Louis

On February 1 the Club met at the Congress Hotel. Following the dinner, a brief business meeting was conducted by Ellis C. Littmann'33, Club President. One of the projects which the Club is undertaking is the publication of a new roster. We hope that all M.I.T. Alumni now living in St. Louis and vicinity will contact us in order that we may list everyone in the new roster.

Immediately following the business meeting, President Littmann introduced our guest speaker, Richard Henry Bolt, Director of the Acoustics Laboratory of M.I.T. Dr. Bolt gave us a very interesting and often amusing account of some of his experiences in the field of acoustics. Those members of the Club who are employed by the McDonnell Aircraft Corporation were especially pleased to have Dr. Bolt visit us here in St. Louis. Acoustical problems are constantly confronting the M.I.T. men at McDonnell.

It was very gratifying to have 45 of the St. Louis Alumni present at this meeting. Those who attended were: Mitchell V. Allen'24, Arthur W. Baker'26, Arthur Beckington'46, A. H. Clarke'15, Churchill C. Condie'32, L. K. Cowie'22, Herbert DeStaebler'21, L. F. DuBois'38, R. M. Edholm'45, Paul F. Ely, Jr., '2-44, Edwin J. Grayson'17, W. A. Hanpeter'46, E. A. Harris'30, William F. Hecker'42, T. R. Heim'32, E. C. Henderson, Jr., '33, Homer V. Howes'20, Charles H. Hurkamp'27, Leon L. Katzenstein'13, Argo E. Landau'26, Ellis C. Littmann'33, C. W. Loomis'16, E. W. May'34, James J. Mazzoni'31, James C. McAllister'50, C. Rogers McCullough'22, Frank Mesker'27, I. R. Mitchell'30, Donald K. Morgan'32, Vaughan Morrill'41, Hugh B. Morrison'48, A. J. Pastene'13, Wallace C. Philoon'47, Milton L. Rand'50, Laurence P. Russe'41, William F. Saunders'19, M. A. Sayles'34, William L. Schubert'41, B. R. Stetson'27, John Sweeney'33, J. D. Sykes, Jr., '50, John E. Taylor'46, H. von P. Thomas'16, David Q. Wells'30, and Michael Witunski'43. We also had as our guests Mr. Labate'48 and Mr. Pietrasanta'51 who were accompanying Dr. Bolt. — WILLIAM A. HANPETER'46, *Secretary-Treasurer*, 1502 St. Louis Avenue, St. Louis 6, Mo.

M.I.T. Club of Southern California

The second M.I.T. Regional Conference, sponsored by the M.I.T. Club of Southern California, was held in Los Angeles at the Elks Club. Over 300 Alumni and guests attended, including many prominent representatives of industry and education. After the brief welcome by the Club's President, Page Golsan, Jr., '34, President Killian'26, on a broadcast telephone conversation, joined Cambridge and Los Angeles in a ceremony at M.I.T. inaugurating the installation of the newest type of switchboard.

The regular conference program was keyed by the very thought-provoking opening talk of Dean Sherwood'24, "New Frontiers of Science." Dr. Draper'26, Head of the Department of Aeronautical Engineering at M.I.T., drew a very interesting simile in his talk, "Brains for Metal

Birds." He discussed one of America's most important developments going on today, the guiding and accurate directing of its newest weapons. The subject could only be discussed in generalities, but Dr. Draper's approach illustrated the problem and reflected the progress being made. One of the most intriguing aspects in the use of elaborate mechanical brains (which occupy much space and involve much weight) is the relaying of information from one or more missiles to a ground station where the more elaborate "mechanical thinking" is done and the missiles are guided accordingly.

The noon recess and luncheon gave a period of good fellowship. The Alumnus from the earliest class was introduced—William L. Woollett'94. Zenas Briggs'00, Carl F. Johnson'01, Kenneth C. Grant'02, and Herbert M. Morley'03 were other early graduates on hand.

In the afternoon, the first talk, by John G. Trump'33, Associate Professor of Electrical Engineering, on "Atomic Particles and Radiation," was a scholarly presentation a layman could understand. Special emphasis was on the remarkable results obtained with the Van de Graaff generator, electron ray, and revolving patient in curing malignant disease. Concentration of heavy doses is permitted at the infected spots without the same handicap of tolerance to healthy tissue of other radiation treatments. The audience's questions and Professor Trump's concise answers added still further to the intense interest. It was necessary to call a halt so that we could proceed with the program. The other afternoon speaker was Richard H. Bolt, Director of the Acoustics Laboratory, who spoke on "Sound and Ultra Sound." It was a talk to be heard and not described. If any guest's enthusiasm had not reached its high point before, it had a second chance.

The cocktail hour gave another opportunity to visit, meet former classmates, school principals and supervisors, friends in industry, or just relax after the searching questions raised by the speakers. At dinner, a brief business meeting was held and the report of the Nominating Committee (consisting of Hiram E. Beebe'10, Francis B. Morton'13, William Mellema'15, and Philip K. Bates'24) was adopted, and the following men were elected as officers of the Club: Rockwell Hereford'24, President; George Cunningham'27, First Vice-president; William H. MacCallum'24, Second Vice-president; Robert E. Hiller'31, Treasurer; Victor Stanley'44, Assistant Treasurer; Philip Herrick'24, Secretary; and James S. Cullison'41, Assistant Secretary.

President Hereford took over the gavel and introduced the guests of honor, including Dr. and Mrs. Killian; Donald P. Severance'38, Secretary and Treasurer of the Alumni Association; H. E. Lobdell'17, Executive Vice-president of the Alumni Association; Samuel C. Prescott'94, a former President of the Alumni Association; Lee A. DuBridge, Honorary Member of the Alumni Association and President of the California Institute of Technology; John J. Rowlands, Director of News Service at M.I.T.; and Walter H. Gale'29, Secretary of the Institute. William L.

Stewart'23, Vice-president of Union Oil Company, who had just been nominated to membership in the M.I.T. Corporation, was also introduced.

The address of the evening, "Bringing the Institute to You," by Jim Killian, did just that. It was a perfect conclusion to a very stimulating day which brought Alumni and their friends closer to each other and the Institute. It did much for the prestige of M.I.T. in the West—HIRAM E. BEEBE'10, *Review Correspondent*, 1847 North Wilcox Avenue, Hollywood 28, Calif.

CLASS NOTES

• 1890 •

Mrs. Helen Wright, whose address is 600 Westgate Street, Pasadena 3, Calif., writes that she is at work on a biography of George Ellery Hale who was perhaps our most widely known classmate, and for whom the great Palomar telescope has been named. She asks for "any memories you may have of M.I.T. in the days when you were there—memories of its physical appearance, of your classes and professors, as well as the extracurricular life, particularly anything you may remember of George Hale, of his appearance, his personality, his way of talking, also of any classmates who were outstanding for one reason or another, even the smallest anecdote which would help to give a picture of the college life." She says she has a great deal of material for all the rest of his life but the material on his college life is all too meager. There was very little "college life" for any of us in those days, but very likely some may have a few reminiscences which can be sent to Mrs. Wright at the above address. If anyone thinks his remarks may be too lurid, the Secretary will be glad to pass them on anonymously. — GEORGE A. PACKARD, *Secretary*, 53 State Street, Boston 9, Mass. CHARLES W. SHERMAN, *Assistant Secretary*, 16 Myrtle Street, Belmont 78, Mass.

• 1892 •

Arthur J. Ober and the Secretary represented the Class at the midwinter meeting of the Alumni Association at Walker Memorial on January 31 and after dinner listened to Dr. Compton's fine welcoming address and a program under the direction of Dean Harrison. In this program, James M. Austin'41, of the Department of Meteorology, brought us up to date on weather forecasting and M.I.T.'s contribution to this science. Professor Francis O. Schmitt, of the Department of Biology, discussed recent accomplishments in the improvement and preservation of health, showing us slides made by the electron microscope with magnification of a million or more. Professor Gordon S. Brown'31, of the Department of Electrical Engineering and present chairman of the Faculty, discussed the subtleties of feedback with simple examples from everyday life and some industrial applications. The Class of '92 was the oldest class represented at the meeting and sat at a table with representatives of '93, '94, and '96.

The Secretary has little news to report other than that Ober and he agree that the celebration of our 60th anniversary next summer should be limited to a luncheon or dinner within 25 miles of Boston, and by the time you read this you should have received a notification of the event. — CHARLES E. FULLER, *Secretary*, Box 144, Wellesley 81, Mass.

• 1895 •

We regretfully report the passing of Professor Charles M. Gay in New York City on December 15, 1951. Gay graduated from Harvard in 1893, then came to Technology during 1893–1895 to obtain his S.B. in Architecture with our Class. He studied at the Ecole des Beaux Arts in Paris from 1896 to 1899, and from 1900 to 1927 followed his architectural work in New York City, starting with Clinton and Russell, 32 Nassau Street, New York City. He was professor of architecture at the University of Pennsylvania from 1927 to 1937, when he joined the Franklin Institute, and, in addition to being assistant director, he was chief of the marine transportation section until his retirement in 1950. He served during World War I as captain with the Army Engineers. Gay was a member of the Newcomen Society and the Xi Fraternity.

Information from the Alumni Register tells us that Milan P. Harlow passed on January 29, 1951. Harlow was with our Class during 1891–1892 and then went into the lumber business as the Harlow Lumber Company of Hartford, Conn.

Like a breath of warm air from the hills of Virginia to the frigid climate of New England is the letter received from Judson Dickerman. Apparently this letter is in response to the Secretary's blast to all '95 men for information about themselves. Dickerman is retired from his long services with our government, living happily with his family at 1705 Rugby Avenue, Charlottesville, Va. He writes: "Perhaps few of our mates at this time of life do anything worth mentioning. Some who have not been too fortunate during their working days have to crawl into holes to conserve their minute resources, and plenty, no doubt, can do little but sit in an easy chair. However, I rather guess our Class has as good a record of activities in old age as most classes, when we think of Sloan, Swope, Ballou, Hunt, and a number of others. Louis Abbot writes me that he and Mrs. Abbot have decided to migrate from the stern, rock-bound coast of Maine to a warmer climate—from Boothbay Harbor to warmer North Carolina. I know I would hate to face the intense New England weather. We like it in central Virginia, where we are about 600 feet above sea level in the shadow of the Blue Ridge Mountains which protect us from many of the cold storms that slide up the western slopes of the Appalachian Range to bluster New York and New England. We have cold enough to break the monotony, enough so that houses are built with adequate central heating plants. When the sun shines it really gets warm in sheltered places. There are about five M.I.T. men living in Charlottesville, some as faculty members of the University of Virginia, but all are much younger than I am." Dick-

tells us he has a lot of trouble with his right thumb, probably due to infection from some of the plants he nursed last summer. His chief outdoor occupation is tending new shrubs and vines, strawberries, raspberries, and flowers. His eyesight is dimming considerably, one eye badly; however, he seems to be in good health and continues his activity in singing. Choir service is a weekly must, and he was rehearsing for the chorus in the Gilbert and Sullivan operetta, "Iolanthe," given in March. His home-repair work is suffering somewhat from his eye condition, yet he still has the beauties of nature to enjoy. Dickerman is also a philatelist and is ever ready to swap stamps. His letter brings with it the reflection of a virile mind, enjoying the best of things for his age, and savors of a psychological attitude in life that is refreshing.

Mates, tell your Secretary whether or not you play chess, cribbage, or solitaire for a pastime. — LUTHER K. YODER, *Secretary*, 69 Pleasant Street, Ayer, Mass.

• 1896 •

Greetings! The midwinter alumni dinner of January 31st in Walker Memorial found five members of the Class present: Davis, Driscoll, Rundlet, Howard, and Rockwell. Fred Damon was prevented from being present because of an attack of general arthritis. We can report improvement with expectations of his being back to normal in a few months.

We are indebted to Myron Pierce for report of the accident to Dan and Mrs. Bates. The following letter from Dan gives the authentic account: "I am just getting back into the swing of things. First, I want to thank you and all of my dear classmates most heartily and sincerely for your kind thoughts of Mrs. Bates and me and for the lovely flowers which you sent us, a lovely mass of springtime color with beautiful gladioli, iris, and snapdragon. We certainly had a narrow escape three weeks ago yesterday, January 17th, and the dear Lord was good to us, for it seems now that both Mrs. Bates and I are going to be all right again; but it takes time. We each had a broken arm and her legs are broken and her hip was dislocated. However, we are marvelously lucky to have had the accident happen near here and to have the wonderful doctors who have cared for us, particularly Dr. Bohlman, of Johns Hopkins training, who is an outstanding specialist on bone work. My best to you and will you also get in touch with Jim Driscoll and tell him how much I appreciate his letter which was received just after I received yours. With best regards and dear memories of old '96."

James Driscoll is constantly in touch with your Secretaries and expresses his interest in the Class by his timely and prompt personal interest through letters and other communications relative to his classmates. Ralph Henry has called on your Secretaries several times, and seems to sparkle with energy born of a New Hampshire winter climate. He reports that he is continuing with his architectural interests. It is interesting to note the accumulated energy that certain classmates express in various outlets. One such example is to be found in Charles Gibson's

latest poem, "Long Live the Queen," published in a February Boston *Herald*: "Daughter of England and a thousand years/Of sovereign state whose monarchy endears/Its ancient emblems to our changing days,/We hailed a Princess with endearing ways!/While crimson rivers run with warlike tears,/And fill the world with fallacies and fears./How gladsome was the welcome to our shores/For one whose virtue all the world adores!/Here, with her princely Consort — we may claim /New kinship to the old historic hours,/ That paved with victory our paths to fame,/And brought us to the days of greater powers./So at this solemn moment, let us raise/Our voices to the skies in thanks and praise./Heavenward, the dove of peace flies high indeed,/If we but hold it steadfast in our view/Of things to come, and keep our sacred creed/Free from all discord and that evil hue/That clouds the world in which we live today./God grant, that in our time, the parts we play/Bring happier transport to the distant years,/ With fewer wars and fewer bloodstained tears./And may the royal barge, that monarchs bore/A-down the historic river to the seas,/Continue in its progress, as of yore,/The angry waves of ocean to appease."

We also wish to congratulate Charles E. Trout on his 80th birthday. He is vice-president and manager of the Great Lakes Dredge and Dock Company. We share with others an acknowledgment of his distinguished career. We are pleased to share with you this very interesting letter from Will Coolidge: "Dorothy and I are having a fine trip. We flew from New York on January 8 and spent 10 days in the Hawaiian Islands and a week in Fiji. From Auckland, New Zealand, we have flown to the southern end of the South Island and will work back by automobile through the two islands. We have, so far, been very lucky in our weather and in other ways. We left Suva, Fiji, just the day before the destructive hurricane hit the place and, had we not by chance departed from our itinerary, we would have been in Racky Racky when the hurricane hit it so destructively.

"Then, even before we left home, I had looked forward to acquiring in Fiji at least a square foot of tapa. We saw none for sale; but, while walking one day, we made the acquaintance of a native Fijian, snapped pictures of him and his family, and were, in return, rewarded by the present of about 30 square feet of tapa. Heavy rains have recently caused much damage to some of the roads in this area and, had we arrived here a few days earlier, it would have necessitated serious changes in our plans. Perhaps the high spot of our trip so far has been the Hawaiian Island of Maui. There you are driven to the top of the crater of the old volcano, Haleakala, over 10,000 feet high, and look down about 3,000 feet to the bottom of the crater, which is 21 miles in circumference. Incidentally, the Hana-Maui Hotel on this island is one of the most attractive hostleries it has ever been our privilege to discover. After three weeks in New Zealand, we will start for home, breaking the journey at Corvallis, Ore., to get acquainted with William David Cool-

idge, 2d, and his four-months-old twin sister."

We have the following letter from Mrs. Conrad Young: "This is just a note. I have been quite ill at times but I now am improving and my heart is better. I am going to make my home here [Bridgeport, Conn.] with my niece, Dr. Alice Rockwell. She checks up every evening, and I do feel a bit stronger. Connie's passing so quickly without a word was a dreadful shock. When I learned he had lost his way after crossing the bridge over to the Cape, I worried when he did not come home since he had gone to Hyannis, after calling me to see if I was all right and telling me he would be home soon. My niece told me last week he knew he was liable to have a stroke at any time, but did not want me to know. I had a card from Dan Bates today telling me of his accident. He wrote of the notice of Con's passing which he had read in *The Review*. We had a very heavy snowfall last evening and all night. Tonight there is a beautiful sunset. I have not been downstairs for 10 days and it is over two weeks since my niece took me to ride in the Oldsmobile. I still have it, but put the house at Bass River up for sale."

Continued reports from John Tilley give us an outline of the New York contingent which has just staged another complimentary dinner given in honor of your Secretaries. A change of address for Charles H. Hurd: Box 90, Jennings, La. — JOHN A. ROCKWELL, *Secretary*, 24 Garden Street, Cambridge 38, Mass. FREDERICK W. DAMON, *Assistant Secretary*, 275 Broadway, Arlington, Mass.

• 1897 •

James M. Brown, Course II, died in Mt. Vernon, Ohio, on January 14, aged 78 years. He was a retired mechanical engineer, an honorary member of the American Society of Mechanical Engineers and a 32d degree Mason. He was a graduate of Kenyon Military College and also had attended Williams College. He leaves his wife, one son, one daughter, seven grandchildren, and four great-grandchildren. Burial was in Massillon, Ohio. As late as the latter part of last November your Secretary received from Mr. Brown a letter asking for the present address of one of our classmates whose name had been mentioned in the class news column. The sympathy of the Class is hereby extended to Mrs. Brown and the family in their loss. We have been advised, without further particulars, of the death on December 29 of Henry C. Greene, Course IV, of 10 Longfellow Park, Cambridge, Mass. — We are sure that the deep sympathy of the Class will go out to Commander Frederick A. Hunnewell on the passing of his wife on January 17 at Winter Park, Fla., where they were spending the winter. All those who were at Osterville for our 50th reunion will recall the pleasing presence of Mrs. Hunnewell who was with us at that time. Fred's address is 219 Ontario Apartments, Washington, D.C.

We were pleased to receive a Christmas card from Proctor L. Dougherty who lives in Washington. Proctor inscribed his card as coming "from the land of slander or the cave of the winds, whatever you want to call it." In January, George Wad-

leigh had lunch with Proctor at the University Club in Washington. Proctor is very active in the club's affairs, is a member of the house committee, and has made many improvements in the library, squash courts, swimming pools, and so on. George frequently sees Tom Weymouth who was the originator of the well-known gas flow formula used by the natural gas companies. George is a consulting engineer with an office at 500 Fifth Avenue, New York City, and deals with problems of the pulp and paper industry. As to his activities he states that he "serves on two local village boards in Hastings-on-Hudson, is promoting the well-being of a local hospital, and is plugging the holes in the mechanics and hydraulics of the paper industry." All of which, he states, "leaves me little time to worry about Vishinsky, Malik, and so on, not to mention mink coats and refrigerators." Little progress has been made as of February 14 on plans for a reunion in June. Indications are, however, that they will be limited to a noonday luncheon with an afternoon get-together at some club in Boston on the Tuesday following Alumni Day, which is observed on Monday, June 9. Full particulars will be sent out by letter the latter part of April. A call for money for class dues will be included in the letter. — JOHN A. COLLINS, JR., *Secretary*, 20 Quincy Street, Lawrence, Mass.

• 1899 •

At the Alumni Council midwinter meeting on January 31 at the Graduate House, our Class was represented by Skinner, Schmitt, Richmond, George C. Glover and his son George R., '43, Sherrill, and (adopted for the occasion) Lobby Lobdell.

Miles Sherrill reports that x-ray pictures show that he has recovered in a satisfactory manner from the several fractures he received in an automobile accident a year or so ago. Your Secretary can also report satisfactory progress in recovering from his seven-weeks hospital sojourn. George Priest, who has been staying at the F. F. Ranch at Oklawaha, Fla., has returned to his mountainside ranch house in Brattleboro, Vt., according to information received from the Alumni Secretary's office. Wonder if he roped any alligators. He returned during a period of near-zero weather. Quite a change of climate, George.

Again I appeal to classmates to write to me telling of their experiences in their particular professional field. I would gladly make these notes longer if I had the raw material. Please don't take that word "raw" in the wrong sense. — BURT R. RICKARDS, *Secretary*, 381 State Street, Albany, N.Y. MILES S. RICHMOND, *Assistant Secretary*, 201 Devonshire Street, Boston, Mass.

• 1900 •

Have you made your reservation at The Pines for our reunion beginning June 10th? Please let the Secretary know if you intend to come.

The midwinter meeting of the Alumni Association was attended by 11 of the Class and guests. These were: Brock, Comey, Fitch and his grandson, Whiting R. Willauer, Lawley and son George,

Leary and son John, Newhall, Silverman, and the Secretary. We had a pleasant social time at dinner and all enjoyed the program. The next alumni affair will be Alumni Day on June 9. We hope that many of our Class will attend.

Several changes of address have been received. Sumner Manley is in Florida at 1913 20th Street South, St. Petersburg. Maurice Davenport has moved from Norwalk, Conn., to Wilton, Conn.; address Forge Road, Rural Free Delivery No. 2. George Atwood has gone from Brooklyn to 40 Washington Avenue, Milltown, N.J., and Ralph Hamlin from Minneapolis to Brookline Manor Apartments, Reading, Pa.

News of the Class is scarce. If you want more you must send me information about yourselves. — ELBERT G. ALLEN, *Secretary*, 11 Richfield Road, West Newton 65, Mass.

• 1901 •

As these notes are being written (about the middle of February), I am glad to report that replies to the class letter with accompanying financial enclosures are coming in splendidly. Apparently our 50th reunion gave a boost to our class spirit, which I hope will not taper off as time goes on. It seems to me that while most of us cannot get together personally, we can at least talk to each other on paper. I asked Mrs. Peterson to write to some of the men with whom we have lost contact. She has had very little success and says that when a man has retired he feels that his doings are so trivial that no one would be interested in them. I agree with her, but the truth is that the Class likes very much to hear of the everyday doings of their retired classmates. Now that you all are receiving *The Review*, I hope that these words will cause you silent members to give us something to read. Let's have it even though you feel it is not worth telling. With this preamble, I will relay some of the class news.

I regret to have to report the death of George P. Shute in Columbus, Ohio, on December 29, 1951. Phil Moore corresponded with him before the reunion urging him to come but he could not make it.

Mrs. Peterson sends me word that Joe Evans, who has apparently jumped back to Chelmsford, Mass., was married on January 26 to Myrtle Killpatrick of Lowell, Mass. Mrs. Peterson has met the lady, says that she is very charming, and that Joe is a lucky man. For the Class, I extend congratulations to the bride and groom. The following are from some of the class letter replies. Victor Sammet, who was at the reunion, says: "Have not retired. Have been president of the Northern Industrial Chemical Company since 1908 when Schlesinger and I founded the company. We have been associated together for 43 years. We have a wonderful organization of young executives who assume most of the responsibilities." Ted Davis of Waterbury, Conn., our class poet, reports: "As I mentioned at the dinner in June, I am still on the final stretches of the historical research on some of the oldest lines of products of Scovill Manufacturing Company. As the plant celebrates its 150th anniversary this year, I am trying to add my

bit, in this way, to its celebration." He also says that he had a letter from Jack Scully in reply to the Lafayette button which he sent him.

I quote from a kind note on Charlie Tufts' reply: "You do a better job of making bricks without straw than anyone else I know. The Review has come regularly for years — I believe I am a life member — yet I always enjoy your review of The Review, plus, of course, the additional late items and your own comments. You may be sure I'd try to make your task easier if I had anything of interest to contribute. If 'happy the nation that has no history' goes for individuals as well, why I should be blissful. The reunion is still remembered with much pleasure." Charlie suggests that the Secretary tell something of his doings. So here goes. We sold our house in Wellesley Hills in September and started building a small five-room ranch-type house in East Jaffrey, N.H. As we had to vacate immediately, we moved our furniture to New Hampshire, put it in storage, and came to stay with my brother, who makes his home in Jaffrey, until the house was ready. We expected to occupy our home about December first but, owing to the very rainy autumn and the other usual delays which always accompany the building of a house, it was January 31st when we finally moved in. We have a very comfortable small home in the village of East Jaffrey, half a mile from the post office, and I know that we are going to enjoy it. My wife's ancestors came from this town and we are acquainted with quite a number of people. As Fred Sexton wrote a short time ago, I believe that a country town is a good place to spend a retired existence. If any of you pass through East Jaffrey be sure and look me up. As I am finishing this writing a notice has come of the death on January 2 of George T. Wilson, retired, of Danvers, Mass. More class news next month. — THEODORE H. TAFT, *Secretary*, East Jaffrey, N.H. WILLARD W. DOW, *Assistant Secretary*, 287 Oakland Street, Wellesley Hills 82, Mass.

• 1902 •

Notes from Dan Patch, the chairman of the general committee for our 50th: "By the time you are reading this in The Review, we hope that our final 50th reunion letter shall have been mailed and that you have sent in your reservation so that our hotel committee can be making assignments, getting the elephants and the kangaroos segregated from the monkeys and baboons. If by any chance you have not sent in a reservation and repent on seeing this, write a letter to Burt Philbrick at once correcting your error. Remember that the three days at the Coonamessett Ranch will cost \$42. The actual expense is a few cents more than this, but, while we are not flush, our treasury can absorb the difference. This allows you to think in even dollars and includes room, meals, tax, and tips. We return to Cambridge in time for the alumni day events on the following Monday, June 9th. It usually costs \$10 for the full program: noon luncheon and banquet in the evening. The noon luncheon, alone, is usually around \$2.50." Even if you cannot come to these events

you should make every effort to take part in the commencement procession and exercises on June 6 and help the Class make a good showing for the Institute. We shall have the honor of wearing caps and gowns, a novel experience for most of us, and be seated on the platform as guests.

Few men will be missed more at the reunion and exercises than Adrian Sawyer, whose death was covered in the March issue of The Review. He was always active in all class affairs and this year had been more than ever.

Dan Patch has been presented recently with his fifth grandchild, a grandson, Donald Edward Patch, who weighed in at 11½ pounds. Dan is debating whether or not he should have the hospital scales checked. From the Alumni Office we have learned of the death of Albert Thomas Church in December, 1950, in Oakland, Calif., where, according to the class records, he has made his home for many years. From the same source comes the news that Edwin E. Kimbal, Course VI, died in Schenectady, N.Y., December 26, 1951. Kimbal went with the General Electric shortly after he was graduated and remained with them until he was retired. William N. Brown formerly in Arlington, Va., is now with the U.S. Navy Shipbuilding Scheduling Activity, 1409 North Broad Street, Philadelphia. Reverend Philip C. Pearson has left New York state to reside in Fair Lawn, N.J., Apartment 8, 20-20 Calyne Drive. At the time of his last letter he was still active in his church work.

Luke Collier retired in 1946 after over 43 years with the United Shoe Machinery Company. He now lives at 21 Pilgrim Road in Marblehead, where he "enjoys a little club life, several trips by auto each year, working around the place, rock garden, and so on." His major project has been the preparation of a family genealogy of the Collier line since 1822, when the first emigrant ancestor arrived, up to the present generation. Luke has prepared about a hundred copies in book form, of 300 pages each, and distributed them among the descendants. It may be said here that "head-hunting" of this type is most interesting and gives one closer insight into local history and a better understanding of the past social life of our country than any formal teaching.

Several short biographical sketches have been given lately in these notes, but most of them have been of men in industry. We have, however, several classmates who have made teaching their lifework, in whole or in part, and one such person is Harold A. Everett, Course XIII, who is now professor emeritus, mechanical engineering, the Pennsylvania State College. After graduation, he was for a year with the Fore River S. & E. Building Company in Quincy, Mass., as outside machinist, then with the New York Shipbuilding Company in Camden, N.J., as estimator and computer. In 1904 he returned to the Institute and remained until 1915 as associate professor of Naval Architecture. He then became professor of marine engineering in the postgraduate department of the U.S. Naval Academy, Annapolis, Md., where he remained until 1918 when he became chief engineer and naval architect with the Union Shipbuilding Com-

pany at Baltimore. He left there in 1922 to become associate professor of mechanical engineering at Pennsylvania State College. In 1924 he became professor of thermodynamics, and served in that capacity until 1931 when he became head of the Mechanical Engineering Department. He was retired in 1946 as professor emeritus. During the years he has written a large number of professional papers and has joined in the activities of many professional and nonprofessional societies. He says he is now living quietly without academic duties but with a modicum of consulting work which keeps him out of mischief and sustains his professional interests. He hopes to be with us in June. — BURTON G. PHILBRICK, *Secretary*, 246 Stuart Street, Boston 16, Mass.

• 1903 •

Myron Clark is the only member of the Class known to be making news at the moment. I quote from a memorandum from the Review Office, under date of January 31, 1952: "Among 18 authorities in the fields of management engineering, labor, industrial relations, and economics appointed in January to advise the newly-formed Mutual Security Agency, are John W. Nickerson '09, Myron H. Clark '03, and Joseph N. Scanlon, staff. The agency, which was created to help western European countries raise their productivity, will act as a successor to the Economic Cooperation Administration. In making the announcement of appointments, Richard M. Bissell, Deputy Director for Mutual Security, said: 'The caliber of those asked to serve on the new advisory group reflects the importance that Mutual Security Agency places on the drive, not only to better the output of European industry, but also to improve the standard of living.' " Good for Clark. Apparently no thought of retiring from active work. Just at present, February 17, the following are known to be wintering in Florida: Sears, Hewitt Crosby, Lounsbury, H. S. Morse, Regan; and probably Regestein, Frank Cox, and Frank Reed, as well as the all-the-year-round Floridians, Chadbourne, Rapp, and Lund. Today on Cape Cod, it rains and blows, and the temperature is just above freezing, making Florida seem a bit attractive to your Assistant Secretary. Eustis takes off for a two-months vacation the 26th of this month, February. Good luck to you all. — FREDERIC A. EUSTIS, *Secretary*, 131 State Street, Boston, Mass. JAMES A. CUSHMAN, *Assistant Secretary*, Box 103, South Wellfleet, Mass.

• 1906 •

The following item furnished by the Alumni Office concerning one of our classmates was overlooked by the Secretary in preparing notes for previous issues. As it will be news to most of our readers, it is included below with apologies to Riley for the delay: "On October 30, 1951, J. Garfield Riley, a member of the Class of 1906, retired from the service of the United States after some 40 years of service. On that date the Attorney General of the United States, Honorable Howard J. McGrath, in the presence of a group of fellow employees in the Department of Justice,

presented Riley with a brief case on behalf of the employees of the legislative and general section of the Division of Lands of the Department, the section in which Riley was terminating his employment with the United States. The Attorney General referred to Riley's long service with the government in making the presentation. Riley graduated from M.I.T. in 1906 with the degree of B.S. in Chemistry. He spent the balance of that year abroad and upon his return was associated with Professor Samuel C. Prescott '94, later Dean of Science at the Institute. Entering the employment of the government in 1909, he was in the Bureau of Chemistry under the late Dr. Harvey W. Wiley, the well-known food expert. Soon he was in charge of the Fermentation Laboratory in the Bureau. He was commissioned a captain in the Sanitary Corps, U.S. Army, during the first World War, serving under General William C. Gorgas. Upon his promotion to major he was sent overseas and served in England and France. Returning to the United States, he entered the Treasury Department as a chemist. While there he studied law at the Washington College of Law, now the Washington College of Law of American University, receiving the degrees of LL.B. and LL.M. He taught in the law school for 12 years and then became one of its trustees and is today a trustee of American University.

"He is vice-president of the National Mortgage and Investment Corporation, owners and operators of the Capital Garage in Washington (said to be one of the largest enclosed garages in the world), dealers in Chrysler and Plymouth automobiles. Riley is a member of the George Washington Post of the American Legion, D.C., the Washington Golf and Country Club, and a life member of the Sigma Nu Phi Fraternity (Legal)."

Carroll A. Farwell, who is a member of the engineering firm of Fay, Spofford and Thorndike of Boston and New York, was elected president of the American Institute of Consulting Engineers in New York on January 15. Carroll is a past president of the Boston Society of Civil Engineers, the Northeastern Section of the American Society of Civil Engineers, and of the Engineering Societies of New England. Carroll very modestly submitted this information via a note from his secretary which also advised that George Burpee, who is vice-president of the A.S.C.E., was to be in Boston on January 28 and would speak at the January meeting of the Northeastern Section of the A.S.C.E. The Secretary contacted Carroll to learn the meeting place and was asked to attend as a guest of the past president. The invitation was accepted and the writer had an opportunity to visit with the speaker and to enjoy a good dinner and a most instructive talk. At present George is a partner in the engineering firm of Coverdale and Colpitts in New York. In his talk he paid tribute to the Boston Society of Civil Engineers and to Boston for the number of notable engineers who had come from this part of the country. The major portion of his talk was based upon the premise that an engineer by his training and experience is well equipped to analyze all the phases of business, and he then discussed the many

items which should be considered in a study of a typical manufacturing organization to determine its soundness from a financial standpoint. George concluded with a tribute to the engineering profession and the satisfaction to be found in such a career, citing that his father and his son were engineers, thus having three generations of engineers in his family. It is understood that Coverdale and Colpitts have been responsible for many of the investigations in connection with the building of toll bridges and roads which are now being constructed in different parts of the country.

Eleven members of the Class and two guests attended the midwinter meeting of the Alumni Association. Classmates present were Terrell Bartlett Sherman Chase, George Guernsey, George Henderson, Tom Hinckley, Charlie Kasson, Harry Lewenberg, and the Assistant Secretary, Ned Rowe. The guests were Richard Denham, an employee of George Henderson's who attends Framingham High School and plans to attend the Institute, and Mrs. Lewenberg. Terrell Bartlett, who is a consulting engineer in San Antonio, was in Boston on business. After the dinner he was called upon to take a bow as one of the two men attending from the longest distance. After the dinner the Secretary enjoyed a short visit with Terrell at his hotel. The discussion ranged from M.I.T. to politics, and Terrell expressed the thought that Texas might go Republican this coming fall.

These notes are being prepared ahead of time, as the Secretary and his wife are getting ready for a trip to Florida for about four weeks, beginning February 14th. This will be an auto trip to Miami. We are starting with addresses of fellow classmates known to be in Florida and hope to see some of them. We will return in time for the May issue and any information gathered on our journey of interest to '06 will be reported in that issue. — JAMES W. KIDDER, *Secretary*, 215 Crosby Street, Arlington 74, Mass. EDWARD B. ROWE, *Assistant Secretary*, 11 Cushing Road, Wellesley Hills 82, Mass.

• 1907 •

Probably most of you men who are reading these notes either subscribe to or regularly see *Time* magazine. If so, you have without doubt already noted and read with real interest the issue of February 4, 1952, which had a likeness of our classmate Clarence D. Howe on its cover and which contained a special write-up regarding him. I shall not quote even a small portion of this article in these notes because it is better for you to read the entire story as it appears in the magazine. If you have not already read this, I suggest that you at once arrange through your public library or in some other way to secure a copy of the issue referred to for your perusal. Kenneth Chipman, who lives in Canada, has written to me saying that this article is the best one that he has ever seen concerning our internationally-known classmate, especially as it relates to his past and present positions of great influence and power and efficiency in the Canadian Government.

Under date of January 28, 1952, I re-

ceived a letter from our classmate Leverett Cutten of Allentown, Pa., from which I quote: "I want to assure you that I plan to attend the '07 reunion in June. In the December Review, I was interested to learn that on October 14, 1951, John Frank wrote from Rome, Italy, that he was sojourning in that city and in Florence. I was in Rome October 7 to 10 and in Florence October 11 and 12. On my three-month trip I was four weeks on a circuit trip in England and Scotland and then crossed over to Norway. During seven weeks on the Continent I visited 21 cities, from Bergen in the north to Naples in the south. I would take organized sight-seeing and side trips and then go on foot to get somewhat familiar with the layout of each city. My schedule was definite, with reservations at hotels and on trains, so it was hard, exacting work, but I stood it well and came home in good shape. In Copenhagen I safely crossed a street where 30,000 bicycles pass in one hour, but in Hamburg I was knocked galley-west by one of them, and I still have a lame shoulder. Wild drivers of cars, scooters, and bicycles abound in Europe, and in Britain and Sweden they pass on the left. John extols London, Paris, and Rome, but I will settle for Venice, that pedestrian's paradise where there is not a wheel turning. So much became real that I had known before only by pictures and descriptions, ranging in time from prehistoric Stonehenge to the Kon-Tiki raft at Oslo. Art treasures of all ages were everywhere, and I am trying to untangle memories of lakes, rivers, mountains, castles, palaces, museums, churches, and cities. When the *Queen Elizabeth* left Cherbourg on October 23, I had had enough for one time."

I have learned through a newspaper clipping that our classmate George A. Griffin, who lives in Woods Hole, Mass., retired from his position as Water Department Superintendent for the town of Falmouth, Mass., during January of 1952. George had been an employee of that Water Department for 26 years and superintendent for the past eight years. He has no special plans for the future except to carry on a certain amount of private surveying work in which he is engaged. — I have three new addresses of classmates, as follows: Edward G. Lee, 22 The Palms, Ft. Myers, Fla.; Frank W. Poland, Post Office Box 447, Pocasset, Mass.; Frank R. Vanderstucken, 136 Manhattan Avenue, New York 25, N. Y.

Through the courtesy of James M. Barker of our Class, I have recently received a printed summary of a communication which was presented by him before the meeting of the American Academy of Arts and Sciences in Boston, Mass., on January 9, 1952. The title of this article is "The Middle East — Geographical Solar Plexus." As most of you know, Jim is not only one of the leading businessmen of the United States, being a director in many corporations, but he is also a member of the Corporation of M.I.T. and was the head of the recent United States Economic Survey Mission to Turkey. Consequently, he writes and speaks with authority on the situation in the Middle East, which comprises the countries of

southwest Asia, Turkey, Lebanon, Syria, Palestine, Iraq, Iran, Transjordan, and the states and sheikdoms of Arabia. It is not practical to quote all of the printed report which I have before me, but a part of it, which sets forth some considerations with reference to the future developments in this portion of the world, as Jim sees it from his personal investigation, seems to me to be of particular value and interest to record. I quote as follows: "Certain probable developments in the Middle East area seem reasonably clear. Russia's place in the picture is so dominant that her general situation and what is likely to eventuate from it must be considered. Stalin seems unlikely to risk another world war in his lifetime. Feeling, as he must, that his policies are exhausting the United States economically, and that through his intelligence system he knows what is going on in our intimate councils, it is reasonable to conclude that he wants to live out the rest of his life without undertaking again the responsibilities of leadership in an all-out war with which his forces are probably considerably less prepared to cope than we have been led to believe. He is an old man, and it is problematical what will happen when he eventually dies. It is unlikely that the succession, however completely planned it now is, will take place according to program. No government in history has been able to continue for long as a partnership of joint heads. The Triumvirate in Rome and the Consulate in France are examples. Even more so, the Politburo in Moscow seems unlikely to succeed Stalin as the head of the State, or to be able to agree on one of its members to put in charge, since every one of them knows that if he does not come out on top he will be murdered. A fluid situation such as this surely means eventual though unpredictable changes in basic policy. Even then we shall not have that wished-for golden age of peace and agreement that was contemplated by our costly wishful thinking of the war years. The foreign policy of the Soviet essentially carries on that of the Czars, with the successor government simply adding the new and effective technique of Communism. We seem completely to ignore, to our disadvantage, an outstanding characteristic of Russian psychology which contrasts strongly with our own. The Russian is a fatalist, and does not care when things happen if he thinks that they will eventually come about. We want them done immediately, and by our insistence thus give our opponent a great advantage. Russia, with the boundless resources of Siberia, by the inexorable process of evolution can easily become THE country of the twenty-first century. She knows what war costs, and how little it settles. Her leaders seem unlikely to prejudice the fulfilment of her development by risking an unnecessary war in which she would be directly involved when her great opponent seems willing to bleed himself white. This does not mean that some blow will not be struck at the geographical solar plexus. A blow, in fact, has been struck, not by Russia, but by one of our own allies. The days of gunboat diplomacy by the West are past, but the British Government has handled the Anglo-Iranian matter as

though we were still living in that age. Some settlement, any settlement, in fact, before the irreversible oil-nationalization act was passed by the Iranian Parliament, would have been better than what has happened. The example of Iran's impudent baiting of a great power and her disregard of the United Nations is of course being studied all over the world, and particularly in the countries of the Near and Middle East. This communication is an attempt to analyze facts and to look at the international consequences of incompetent diplomacy. When American foreign policy has become a strange witches' broth of altruism, sentimentalism, fear, business-as-usual, charity, and ward politics, it can hardly be expected that it will stand the test of circumstances. As a result of British and American diplomatic incompetence, trouble is likely to start in Iran. Turkey will stand firm with the West. The Soviet Army is not likely to invade the Middle East. The Politburo consists of realists, and they know that such an act would start the next world war. They will continue to foment the activities of the Communist Tudeh party in Iran. Through their influence at Tehran, they will continue to block any effective settlement of the Anglo-Iranian affair, both because it puts an additional substantial strain on the American economy, and because the lack of oil income will increase the difficulties of existence for the Iranian people, and hence their discontent. When the unrest reaches the proper temperature, Iranian Communists will take over the government without a fight, and another republic, so-called, will have been added to the Soviet galaxy. When that time comes, the American taxpayer will have to comfort himself from the pain of the solar plexus blow by the thought that at least he will not be taxed to support another backward country, unless of course the Shah should learn a lesson from Marshal Tito." — BRYANT NICHOLS, *Secretary*, 23 Leland Road, Whitinsville, Mass. PHILIP B. WALKER, *Assistant Secretary*, 18 Summit Street, Whitinsville, Mass.

• 1909 •

Probably the most interesting class news is that while attending the annual winter meeting of the American Institute of Electrical Engineers in New York, the Review Secretary met Carl Gram, X, our President, and had luncheon with him. He is with Metcalf and Eddy and Alfred Hopkins and Associates at 61 Broadway, New York. This is an organization of consulting engineering concerns who have become associated in some large engineering projects. Art Shaw, I, is a partner with Metcalf and Eddy of Boston, one of the associates. We found Carl working long hours pushing along in his usual vigorous manner an important defense project where time was most urgent. As a matter of fact, he was taking barely enough time for eating and sleeping and he regretted that this had left him practically no time to devote to class affairs. He made some excellent suggestions concerning the conduct of class affairs and also sent his greetings to all of us.

In negotiating with the banks in the

matter of our class funds, we have learned that it is almost necessary to have a set of bylaws, approved by the Class, designating the persons who have legal custody of funds. We should be able to state when such persons and class officers were duly elected by the Class. Carl requested that those attending the alumni meeting on January 31 at Walker Memorial start some action to effect a class organization along these lines. He requested also that thought be given to the matter of a fund to be presented to the Institute on our 50th anniversary, as has become customary with other classes.

There were seven of us present at Walker: Howard Congdon, I, Johnny Davis, II, Chet Dawes, VI, Francis Loud, VI, Art Shaw, I, Chick Shaw, V, and Henry Spencer, II. After some discussion, Carl was nominated for president and Chet Dawes for secretary and the latter authorized to take charge of class funds until the bylaws were approved and a secretary duly elected. Chet Dawes was instructed to prepare a set of bylaws and to submit them to the Class by letter ballot for approval. He was further instructed to submit to the Class, at the same time, a letter ballot for the election of officers. He is already carrying out these instructions. There will be opportunity to write in names of other candidates and the Review Secretary will gladly add to the ballot any other nominations which may be sent to him. In the matter of a 50th anniversary fund, it was decided to defer action until a report (which the Institute treasurer is preparing relative to the class's contributions to the Institute to date) is received.

While in New York attending the A.I.E.E. meeting, we also met Phil Chase, VI, and George Gray, VI. Phil is still chief engineer of the Philadelphia Electric Company and was recently re-elected vice-president of the U.S. National Committee, the United States representative of the International Electrotechnical Commission, an office which he has held for some years. It was in connection with the work of this organization that the Review Secretary went to Portugal last summer. As most of you know, George has been a telephone engineer since a few years after graduation and since 1926 a transmission engineer with the International Telephone and Telegraph Company. In 1949 he retired to a four and one-half acre estate at Little Falls, N.J., which he says is "two acres of woods and two acres of weeds." He spends his spare time modernizing the house and raising sufficient fruit and vegetables for family use. He has a son, M.I.T.'40, married, living in Natick, Mass., and employed by the Doelcam Corporation of Newton. George's daughter graduated from the Maryland College for Women in 1944, married William W. Rice, and is living in Elizabeth, N.J.

During the same visit to New York, we called at Molly's (XI) office but he was in Washington. We learned that last summer he was in Lisbon and Estoril, Portugal, a month later than our visit there, assisting the Portuguese Government in its power development. He sends the following note: "It occurs to me that it may

be of interest to report on my recent and current travels abroad. As you know, I went to Greece for the State Department in 1948, and was later associated with another engineering firm in a report on, and still later in the management of, design and construction of an extensive national electric system in Greece. In connection with this work I made two trips to Athens in 1951, one in April and May, and the other in May and June. In August Mrs. Scharff and I had a short vacation in Paris and Geneva, and then went to Lisbon where I am now engaged on a report on electrical development for the Portuguese Government. I am leaving New York on January 31 for another visit to Lisbon in connection with this work and expect to be back in the United States about February 17."

Since preparing the notes for the January Review we have been attempting to learn more concerning the death of Ramon Munoz, III. Thanks to Ben Pepper, I, a letter to him from Ricardo Ridolfo of Monterrey, Mexico, reads as follows: "Our mutual dear friend passed away at 9:00 P.M. November the 3d. He had arrived that same day at 5:00 P.M. from a business trip to Houston in perfectly good health, had his supper, dressed in his pajamas to get into bed, and, while in the bathroom, suffered a heart attack and was dead when the doctors arrived. He is survived by his only brother, Enrique J. Munoz '10, of this city, who works in the office of Ramon's partner, Ingeniero Fidel Martinez."

When this number of The Review appears, Ben and Barbara will be enjoying a six weeks trip to South America. As many of you will recall, for some time they visited Mexico annually where they met the late Garnett Joslin, III, and also Ramon.

Steve Stephenson, X, sent us a circular from his headquarters in Gardenvale, Quebec, announcing that the second volume of *Pulp and Paper Manufacture*, of which he is editor, had been published. We asked him for further details and received the following: "In response to your request for a news item, here is a bit that will at least fill some space. Since most stories start at the beginning, let's start at commencement 43 years ago. That summer I tramped the countryside for the third time selling the *Century Book of Facts*. Besides talking people into buying the book, I talked Margaret Scott of Wolfeboro, N.H., into saying 'Yes.' My first position was teaching math and drawing at Lawrenceville School for one year. Then came three years at Rose Polytechnic Institute teaching industrial chemistry, other classes and lab work, and getting an M.S. In 1913, Ralph McKee established the first U.S. paper school at the University of Maine and my two years of paper mill work got me a very pleasant and interesting position there. We had a grand time getting the courses organized and teaching other subjects. Then in 1916 the *Pulp and Paper Magazine* of Canada wanted an editor and they picked on me. So Margaret and I came to Canada 35 years ago (December 16, 1916). Harvey arrived in 1919 and Robert in 1921. Harvey graduated from Antioch College after

a military interlude; Robert graduated from Roosevelt School of Aeronautics and served in the Canadian Air Force. He is now with Lockheed Service Corporation in the inspection department. Harvey was in the U.S. Army in Germany and his wife Peggy at a base hospital in Assam. He is now with the Y.M.C.A. in Brooklyn.

"I have had a wonderful time editing the *Pulp and Paper Magazine* of Canada, which of course is the best paper in this field, thanks largely to my capable colleagues who now do the real work. We also put out two annual publications, *The National Directory of the Canadian Pulp and Paper Industries* and *Pulp and Paper Manual of Canada*. The latter consists of engineering articles and data and is a purchasing agents' guide. In 1918 I was on the Education Committee of the Canadian Pulp and Paper Association when the corresponding committee of the Technical Association of the Pulp and Paper Industry (U.S.) joined with us to prepare a textbook. In September, 1918, a Joint Textbook Committee was appointed to proceed with plans for the preparation of the text, its publication, and the distribution of the books. A general outline with an estimated budget was presented and approved at the annual meetings in January and February, 1919, of the Canadian Pulp and Paper Association and the Technical Association of the Pulp and Paper Industry, respectively. A contract was made with McGraw-Hill Book Company to publish the work. A feature of this series is the wealth of illustrations, most of which were especially drawn for this textbook. Another valuable feature of this work, which distinguishes it from all others in this field, is that each chapter was examined and criticized, while in manuscript form, by several competent authorities. In fact, these books are really the work of more than 100 men who are prominent in the pulp and paper industry. This fourth edition, now nearing completion, is practically a new book and is without question the most complete and authoritative text ever produced on the subject.

"The Joint Textbook Committee owns the copyright and has put back into the preparation of this edition the royalties of the past 10 years on the sales of thousands of copies of the third edition. This has made it possible, with generous cooperation of the publisher, to maintain a price far below that of other technical books. The first edition, in five volumes, appeared from 1921-1924 and was followed by a revision in 1928-1929. A more thoroughly revised and enlarged edition was published in 1927-1939 and a total of over 50,000 copies was sold. The Joint Textbook Committee started at the end of the War to prepare a new series of books based on the first. The name is now *Pulp and Paper Manufacture* and the first volume was issued in August, 1950. The second volume appeared in October, 1951, and Volume 3 is now being processed for publication this year. The last volume is scheduled for the first half of 1953. Some six thousand copies of the new volumes have already been sold.

"To help fill in my time I have a couple of church jobs and a pack of Wolf Cubs

(Cub Scouts) who meet in two afternoon groups: Hathi (Elephants) and Bhai (Buffaloes), 28 in each group. I enjoy the M.I.T. Club of Quebec which meets in Montreal. It was a great pleasure to hear and meet Dr. Killian. The Technical Association of the Pulp and Paper Industry medal for service to the industry was given to me in 1939 for work on the textbook and in the field of education of papermakers." — CHESTER L. DAWES, *Review Secretary*, Pierce Hall, Harvard University, Cambridge 38, Mass. *Assistant Secretaries*: MAURICE R. SCHARFF, 366 Madison Avenue, New York 17, N.Y.; GEORGE E. WALLIS, Wenham, Mass.

• 1910 •

It is with deep regret that I have to announce the death of Kenneth Leavens on December 20, 1951.

Carroll Benton writes that he has retired and is considering driving to the Pacific Coast this coming summer, but in the meanwhile he is looking for a place out on Long Island where he will be comfortable. He also sent me a clipping from the *Appalachia* of the Appalachian Mountain Club about Dean Peabody. I feel that the following excerpt from this article will be of interest to those who knew him: "Of the quality of Dean Peabody, the man, the best testimony is to be found in the respect and affection in which he was universally held. Perhaps no member of the same generation endeared himself to so wide a circle of Appalachians. And he was always completely genuine: what he seemed to be, to his more casual acquaintances, he stood the test of continuing to be in his more intimate relationships. He was the best of comrades, the most loyal of friends. In the patient and steady elevation of his thinking and feeling above all pettiness there was something quite exceptional, something which, I feel sure, regularly brought him in turn exceptional treatment, perhaps unconsciously, from his friends and associates. In our unhappy age of the world, when the evil and the base are so much in evidence all about us, perhaps the only sure ground for faith is the existence and example of noble personalities. Dean Peabody was such a one."

Arthur Foote has retired and the following is from the *Union Leader* of Manchester, N.H.: "Arthur J. Foote has retired as engineer and superintendent of highways. Mr. Foote was born in Goffstown, the son of the late Alonzo Foote, and attended the schools here. He studied at . . . Technology, and Northwestern University, and has held a variety of engineering posts with private industry and governmental agencies. During his six years tenure with the Boston and Albany Railroad, he designed a \$3,000,000 grade crossing in South Boston, and while engineer for the Commonwealth of Massachusetts, he assisted in the design of South Boston's Commonwealth Pier and dry-dock. At the time of its completion the dry-dock was the largest in the world. Mr. Foote first became associated with the town of Mamaroneck in 1925, when he became engineer for the Sewer Commission. In that post he designed three drainage pumping stations that were in-

corporated into the county system in 1932. That year he planned two town parks at the Larchmont railroad depot, and from 1934 to 1936 he drew a revised set of assessment maps for the town tax administration. In 1935 he was appointed to the dual engineering and highway posts."

From the *News* of Malden, Mass., is the following notice of the retirement of John Wentworth: "John Prescott Wentworth, 569 Fellsway East, a member of the city's first Planning Board, has taken retirement from Metcalf & Eddy, consulting engineers, where he has been a partner for many years. He has no immediate plans for the future, but has a considerable amount of work he wants to finish. Mr. Wentworth has been with the Metcalf & Eddy firm for 40 years, having joined it in 1911 while an instructor at . . . Technology. He was graduated from Malden High in 1906 and from Technology in 1910, but was called back by the latter institution as an instructor."

I have received an invitation from Achilles Hadjisavva to the wedding of his daughter, who is marrying a lieutenant in the British Marine Corps. I had the pleasure of meeting his daughter when I was in Athens two years ago. John Ahlers, who is a commander in the U.S. Navy, is now stationed at the American Embassy in Rome, Italy. Cliff Hield writes that he is taking a vacation for a month, probably to Hawaii. — HERBERT S. CLEVERDON, *Secretary*, 120 Tremont Street, Boston, Mass.

• 1911 •

A tip of the hat to our classmate Herb Fryer, VI, located at Carnation, Wash., for establishing a \$2,500 loan fund at M.I.T. in memory of his wife. In his annual report for 1951, Treasurer Joseph J. Snyder, 2-44, announces such a gift "to establish the Ethel I. Fryer Scholarship for students from the states of Washington, Oregon and California." A fine thing to do, Bert. Two other '11 men made the gift section of the Snyder report: Howard Williams, XI, our Class Vice-president, who gave \$500 for the Business and Engineering Administration Course, and Luis de Florez, II, with \$25 for the Aeronautical Engineering Course.

Details of the very successful and well-attended annual midwinter alumni meeting at Walker Memorial, January 31, were given in the *Institute Gazette* section of the March Review. Running true to form, we had exactly eleven '11 men present, plus two sons. This included Obie Clark, II; Marsh Comstock, VI; Cal Eldred, VI; Bill Fortune, I; Fred Harrington, I; Jack Herlihy, II; Morris Omansky, V; Carl Richmond, I, and his two oldest sons, Richard A., Harvard '53, and John Q., Tufts '55; Emmons Whitcomb, X; and Aleck Yereance, I, with your Secretary in his accustomed role as song- and cheerleader. Thus the civil engineers led the 1911 field with four present, while there were three electricals, two civils, one chemical engineer, and one chemist to complete the class count of 11.

Although no details were available, word reached us from the Alumni Office early in February of the death of James

R. Carpenter, I, at Miami, Fla., on October 11, 1951. With us for but a short time, he had taken no active part in class affairs. For many years a real-estate operator there in Miami, he had also been resident inspector for the War Assets Administration at the Naval Air Station in Opa Locka near Miami.

Consistent with development plans of Northeastern University in Boston, its president, Carl Ell, XI, announced in late January the purchase of a building containing 80,000 square feet of floor space and occupied by Sylvania Electric Products, Inc., at 70 Forsyth Street, adjacent to the University campus, the structure is of first-class, fireproof construction, and was recently remodeled for offices and laboratories by the Sylvania Company. It was erected in 1926. Approximately 30,000 square feet of land is included.

We received word from the board of directors of the Massachusetts division of the American Cancer Society in late January that a memorial in memory of the late Stan Hartshorn, X, has been established at the society's headquarters, 462 Boylston Street, Boston. This had been made possible through the kindness of Stan's many friends and associates. It was my proud pleasure to present Stan and Jule's son, Stanford H., Jr., '49, for membership in the Gardner Rotary Club; and young Stan, now filling the office of treasurer, formerly held by his Dad, in C. H. Hartshorn, Inc., Gardner baby-carriage and furniture manufacturers, was welcomed as a Rotarian on February 6.

John Herlihy informed me at the midwinter alumni meeting, referred to earlier, that Gardner George, I, of Albany, N.Y., is temporarily with the major controls branch of the Defense Electric Power Administration in Washington, D.C., assigned to projects involving generating plants. He is on leave from the Niagara Mohawk Company.

At hand from Rufe Zimmerman, IX, Vice-president and Chairman, Research Policy Committee, United States Steel Company, New York City, is a leaflet titled *Materials for the Production of Steel*, an outline of a natural resources course given by him at the Industrial College of the Armed Forces, Washington, D.C. In the introduction Rufe states: "The steel industry of the USA is now producing steel ingots at an annual rate of approximately 107,000,000 net tons, representing an increase of more than 25,000,000 tons, or approximately 31% over that existing in 1939. To support the production which is possible with that capacity, and more to be added in 1952-53, it is evident that enormous quantities of raw materials will have to be provided, and finishing facilities will have to be equated against the estimated demands for a wide variety of steel products . . . An objective appraisal of the current situation, with only the necessary minimum of statistics, is the purpose of this discussion." He next lists the basic raw materials in the production of finished products by the steel industry, as iron ore, coal (coke), and limestone, adding that "the iron produced by the blast furnace is high in carbon, silicon, and certain other elements, and may be thought of as an intermediate product in

the conversion of iron ore to finished steel."

He then goes on to stress the need for heavy scrap in the steel industry at the present time, because, he states, pig iron and scrap together constitute the main source of metallics upon which the steel industry is based, with one ton of scrap approximately the equivalent of two tons of iron ore. In addition to the "produced" scrap generated within the steel industry itself, there is that all-important "purchased" scrap from: (1) the metal working industry; (2) recovered steel accruing from dismantling operations and abandonment of obsolete and worn equipment; and (3) miscellaneous discarded iron and steel items. (Here in Gardner, along with chambers of commerce throughout the country, we are backing the defense effort by urging our manufacturers, automobile wreckers, and farmers to put all possible discarded materials in the scrap market.) The leaflet next describes in detail the basic raw materials as listed, following this with a detailed description of refractories, which he connotes "the chief materials used in the steel industry in the construction of furnaces, in the lining of retaining vessels for molten metal, and in flues or stacks through which hot gases are conducted." "Since so many operations and processes of the steel industry are carried out at very high temperatures," he continues, "the industry is inevitably a consumer of vast quantities of fuels, which may be broadly classified as gas, oil, liquid and solid." He lists principal gaseous fuels as blast-furnace gas, coke-oven gas, natural gas, and producer gas; principal liquid fuels as petroleum base fuel oils and pitch-tar mixtures; with coal and coke listed as the principal solids, along with the required electric power.

Then follows an elaborate discussion of the function and importance of other elements required in the production of various types of steel, including manganese, ferrosilicon, nickel, chromium, molybdenum, vanadium, cobalt, tungsten, aluminum (page Chief Wilson!), copper, titanium, columbium, boron, and cerium. Miscellaneous items of outstanding importance, he states, include tin, zinc, and lead as nonferrous metals; sulphuric acid and soda ash, graphite, zirconium ores, palm oil which must be imported from the Far East and Africa, beryllium alloys, and magnesium. Important transportation notes and a detailed comparison of United States production of steel in comparison with all other nations follow, showing that in this country during 1950 we produced about 48 per cent of all steel produced, friendly nations about 35 per cent, and Soviet Russia and her satellites about 17 per cent.

In conclusion Rufe states: "Our steel-making capacity is being further increased, experts from industry and government are combing the world for additional sources and quantities of scarce materials, and stock-piling is providing a modicum of leeway in certain quarters. Would that it were more! Science and technology are devising ways and means of spreading our critical supplies and of developing substitutes where the use of substitutes may become vital. In addi-

tion to all other measures and material things which have been mentioned, we need an abundant supply of genuine, determined, cooperative effort between and among the 'free peoples' of the world who are interested in making their position impregnable." A fine piece of work Rufe—we salute you! Copies of this leaflet are available, upon request to J. Carlisle MacDonald, Assistant to Chairman, U.S. Steel Co., 71 Broadway, New York 6, N.Y.

The idea of possibly having an intermediate class get-together—say at Snow Inn, Harwichport on Cape Cod, some June between now and June, 1956, our 45th—seems to be gaining impetus, as classmates "write to Dennie" as requested in the class notes in the March issue of *The Review*. In early February, Frank and Eleanor Thompson, who with their mother operate that fine Cape Cod hostelry, came to Gardner in quest of some Duncan Phyfe dining-room chairs for an addition just completed on the oceanside of the Snow Inn main dining room. Sallie and I had luncheon with them at the Colonial Hotel here and we relived that week end of June 8-10, 1951, most happily. Both of them said they would like nothing better than an informal M.I.T. 1911 group some June week end in 1953 or 1954—our reservation already being in for our 45th reunion there in early June, 1956. How about you writing to Dennie and giving him your views on the subject, as well as late news of interest to classmates.

Slowly but surely (alas, more slowly than surely at this writing) the 1911 gifts to Alumni Fund XI (1951-1952) are coming in, but it requires a lot more subscribers and additional cash to put us up into our accustomed spot among the leading classes.

Here are some address changes to close: Robert E. Anderson, III, 1516 West Wilshire Drive, Phoenix, Ariz.; Calvin P. Eldred, 24 Canterbury Road, Winchester, Mass.; Armand H. Peycke, II, 820 Wagner Road, Glenview, Ill.; Roger M. Spencer, II, 18 Hollywood Drive, Massapequa, Long Island, N.Y.; Lester A. Stover, 6806 West 73rd Street, Overland Park, Kansas. Right now is a particularly good time to sit right down and "W T D," eh?—ORVILLE B. DENISON, *Secretary*, Chamber of Commerce, Gardner, Mass. JOHN A. HERLIHY, *Assistant Secretary*, 588 Riverside Avenue, Medford 55, Mass.

• 1912 •

We regret to announce the death of Reverend Earle M. Giesie, IV, of Charleston, W.Va., on November 23, 1951. We also just received notice of the passing of Thomas B. Lawler, VI, on December 25, 1951. Tom had been with the International Bank in Washington, D.C., for many years.

Lester M. White, your Assistant Secretary, and his wife will be vacationing in Florida next month. Too bad we couldn't have had our reunion there, as the snow is about 30 inches deep here in Watertown today. The Whites and the C. B. Vaughans had a miniature reunion in New York in December in the form of a dinner party at a place selected by Bolmer, with his usual skill.

Jim Cook writes that he spent a week

in Maine during the hunting season. He saw a live wild deer, the first he had seen in three hunting trips in recent years. He fired one shot and was fortunate in getting a nice doe. Congratulations, Jim. James Cook, Jr., is a senior in Course XV. With a 40th reunion and a son graduating, June should be a big month for the Cooks.

Bernard Morash of Toronto does not expect to attend the reunion this year. His daughter, Carolyn, who was with us at the 1947 reunion, was taken ill over the holidays and was laid up for quite a while. Mrs. Morash and Carolyn will go to Nova Scotia in the spring for six weeks where it is expected that the climate and the salt air will complete her recovery. Bernard will do a little fishing in northern Canada. His son Bill, has made an excellent connection with the firm Management Consultants, where he is getting varied industrial experience. We are sorry that you will not be with us this time, Bernard.

I hope you have all made your plans to be at the Snow Inn on June 6, 7, and 8, as this is the only 40th reunion we will ever have. — FREDERICK J. SHEPARD, JR., *Secretary*, 31 Chestnut Street, Boston 8, Mass. LESTER M. WHITE, *Assistant Secretary*, 4520 Lewiston Road, Niagara Falls, N.Y.

• 1914 •

At the time this is being written, our good Secretary, H. B. Richmond, is on the high seas sailing for South America on business, and your "correspondent" is taking over for this issue and trying to get out the copy. Richmond dropped in my office in New York the day he sailed on the S.S. *Argentina* and we had a very pleasant chat. He didn't seem at all unhappy to have to go to South America while the winter season was just getting into full swing here in the north. He expects to be back in a couple of months and we hope he will bring back plenty of notes on his trip. He is visiting Brazil, Uruguay, and Argentina—and it is summer there!

A letter from Jim Holmes in Los Angeles gives us some interesting news about the work his firm has been doing. Jim is president of Holmes and Narver, Inc., of Los Angeles, Calif. A recent news release of the Atomic Energy Commission says that the A.E.C. has renewed its contract with Jim's firm for the design, construction, and operation of test-site facilities at the Eniwetok Proving Grounds in the South Pacific. The work started in 1948 after a nuclear test program at Eniwetok and included services in connection with the overseas test program last spring. His firm, under a separate contract, provided engineering services in connection with the recent test program at the Nevada test site. In addition to the Eniwetok project, Holmes and Narver has done extensive work for the government in Okinawa, Kwajalein, and Hawaii. It is easy to see why Jim says he is busy; guess he hasn't been letting the grass (or palms) grow under his feet.

Several changes of address came in while these notes were being written but, so far, all we can give you are the new addresses. We hope we can get some news about the changes, if there is any. Hibbard S. Busby is now at 81 Coolidge Ave-

nue, Needham, Mass. He has been in New Orleans with the Department of Agriculture. Morris Goldenberg's new address is 69 Long Hill Street, Springfield, Mass. His last address was Laurelton, Long Island. Walter Leathers is still at Hingham, Mass., but his new address is 182 North Street. Charlie Fiske will be winging his way south shortly. He has to go to Mexico on business for several months and when he gets back from there he has to go to Europe on a two-months business trip.

We had some of the Class present at the midwinter meeting of the Alumni Association at Walker Memorial on January 31: L. D. Charm, E. C. Crocker, L. F. Hamilton, and H. S. Wilkins. While Chet Ober wasn't there, his father, A. J. Ober '92, was present. It must have been a pretty interesting program—weather forecasting, electron microscope in medical work, and automatic control devices for machines that "think"—because over a thousand turned out for it.

Our Class Agent reports that "The Faithful" in 1914 are still doing their part and keeping us in there in the Alumni Fund. What he would like is to get a lot of new converts from the goodly number of those who can do but forget to.

If you have some news, either about yourself or some classmate, send it in. We can use it, and the others would be as glad to hear about you as you are to hear about them in the 1914 notes in *The Review*. The Secretary will certainly be glad to hear from you—any time and all the time. Make a note!—H. B. RICHMOND, *Secretary*, 275 Massachusetts Avenue, Cambridge 39, Mass. ROSS H. DICKSON, *Assistant Secretary*, 126 Morristown Road, Elizabeth, N.J.

• 1915 •

Help! Help! Pay your class dues—not much, and once every two years is not often, so just stick your check in that self-addressed envelope (no postage required). Help the column, too, with a letter about yourself for class notes.

What a Class! Such spirit, such friendliness. An outstanding '15 man, Bill Campbell, in a responsible position with Food Machinery and Chemical Corporation, San Jose, Calif., has been "lent" to the government as assistant to Charles E. Wilson, Office of Defense, Mobilization Production. Bill is chairman of the Production Executive Committee, Defense Production Administration. With all that title, Bill found or took time while in Boston on business to run out to see Fran and me and we had a wonderful visit with him. The best way to tell you about him is to say he has not changed a bit, such Class spirit, such friendliness!

With all the traveling I've done over these years, I've just had my first trip "down yonder" below the famous Mason-Dixon line. In Durham, N.C., I visited Lucius Bigelow, whom I hadn't seen for 25 years. Head of the Organic Chemistry Department at Duke University, Lucius is very active in his work, a true scientist, and very proud of his students and their accomplishments in industry, particularly those with advanced degrees. Lucius showed me around Duke's beautiful campus and buildings, most impressive

of which was the famous chapel — really a touch of the old world. In excellent health and spirit, Lucius is active and happy with his growing family of two teen-age boys. He sends his best to you all, especially John Dalton in Lawrence, Mass. In Winston-Salem, I saw Phoebe Proctor, head of Proctor Chemical Company, Salisbury, N.C. Ed's two sons-in-law are associated with him in his business of making processing chemicals for the textile industry. Phoebe looks and acts the same as when he played on that famous class football team. He wants to be remembered to everyone, especially his rugged old teammates, Frank Scully, Archie Morrison, Weare Howlett, Johnnie O'Brien, and Pirate Rooney. Sorry I missed Norman Doane in Charlotte. In Burlington I visited Ken Fox'40, Vice-president of Burlington Mills Corporation. In Greensboro, N.C., I had dinner (barbecued chicken, Suhl!) and spent the evening with Everett C. Atwell'24, and his charming family. Everett is technical director of Burlington Mills Corporation. This clipping from one of the trade papers seems to show the fine humor of some classmate's hidden hand. It's funny, anyway: "The trend to the southland is really on. Caught in Charlotte, N.C., complete with his broad A's was Azel W. Mack. Azel, New England Sales Manager for the Dexter Chemical Corporation, was attending his firm's winter sales meeting in the Queen City. Azel recalls a unique experience in every city where he has traveled. It being his first trip to the Carolinas, Dexter's southern sales force combined to help him keep up the record. When Azel stepped off the train, he was greeted by dobbin and surrey driven by the Southern sales staff in the garb of the Confederacy, which touched him deeply. Seen again in Greensboro, N.C., where he called on other of his Yankee friends, among them Ken Fox'40 and the Everett Atwells'24, Azel admitted wonderment at the modernity of the cities, homes, and mills of the new era in the southland. Dressed in a natty tropical suit and topcoat, he was caught off base by Mother Nature with a cool 14 degrees above, which naturally made him feel comfortably at home. Predictions have it that he will be seen there frequently." Ah, me! How your poor Class Secretary suffers at the hands of his friends(?) and loves it.

Another class wedding and all our best to this young couple for a long and happy life. On December 22, at the Union Presbyterian Church, Schenectady, N.Y., Phil Alger's son John Rodgers Meigs Alger was married to Judith Harben. John is 1949, Course VI-A. After that omission of class notes last month, here's the first "Help Azel" from Sol Schneider, 310 Washington Avenue, Havertown, Pa.: "Thanks for your Christmas card and note. We do hope that you will see us this year. I am sure that if you and Frances come down this way our classmates will get up a nice party for you both, so, let us know about your trip. I am still at the Industrial Test Laboratory at the Philadelphia Naval Shipyard, with nothing new that I can write in this letter. Sorry that I did not get time to be at the American Association of Textile Chemists and Colorists conven-

tion last fall, but had I known that so many of our classmates were going to be there I would have made a special effort to get to the convention even for one day. I am also sorry that we could not get to Boston last June to go to the class dinner that included our better halves, staged by Wally Pike and his assistants. I had already made plans for our vacation, which was a trip home and a motor trip to Canada. All dates were set and I could not change them. However, this June we hope to make it, if your committee is planning to have a class dinner. While we were in Moncton, New Brunswick, one of our friends there took us to the quaint city of Sackville where we had dinner at the Marshlands Inn. When we walked into the dining room, there was Ernie Loveland and his party having dinner. When he saw me at the door, a surprised smile wreathed his face. After we were seated, which was at the next table, I went over to greet Ernie. The old saying that it is rather a small world is certainly true. I hope that this letter 'Helps Azel.' It must have been pleasant for Sol and Ernie to get together in such a remote spot. When our southern train stopped in Washington on my famous trip, I tried to phone the Chellmans and Virginia. Lloyd's good letter from 1954 Columbia Road, N.W., Washington 9, D.C., explains why. Maybe they can save some of that bourbon until Barbara, Fran, and I get down there: "Have just sent my class dues to Henry Sheils but wanted to drop a line to you to tell you that we, meaning Alice, Virginia, and I, were all very much disappointed that we didn't see you when you were supposed to be passing through our town. As a matter of fact, on the night that Virginia said you were due we were having a birthday dinner here for me, and Virginia was here, as were our son and his cute girl friend, and Alice had set a place for Azel. We had a happy evening and I think you would have enjoyed becoming acquainted with Bud and his girl and renewing your friendship with Alice (with whom you have really had only a long-distance writing acquaintance) as well as being with Virginia again. Another reason for this note is to thank you for your letters and good wishes while I was sick. You were mighty nice to take the time to write and I do appreciate your thoughtfulness. I had a letter from Wink Howlett which I have just answered and told him that I was feeling much better although I seem to be what I am pleased to call tired a lot, but probably am just plain lazy after being waited on hand and foot for several weeks. Sure wish you and Fran and Barbara could visit us. We live a very simple life, especially now, but I have learned to conceal the pain of my aching heart when I serve scotch or bourbon to my friends and a glass of warm milk to myself."

Mary Plummer Rice has moved to 3975-22nd Street, San Francisco 14, Calif., in care of Mrs. Gerhard Becker. We hope to have news from Mary for you next month and, meantime, urge the Bergs and other classmates to extend a welcome to Mary out there. Mervin S. Hart has recently been transferred to 28 Rue Vineuse, Paris 16, France, and I've written him to let us know something about himself and to try

to get together with Ken Boynton who is with International General Electric Company, 79 Champs-Elysees, Paris. Ruth and Gene Place have settled at 2379 Garfias Drive, Pasadena 7, Calif., and I do hope you '15 people on the Coast will see them. I've written Hen Berg in San Francisco to try to get our gang together out there to give Ruth and Gene a welcome. Gene has improved a great deal and will be in the branch office of American Mutual Insurance Company. Gene put up a marvelous fight to make his wonderful recovery. We all miss Ruth and Gene here and wish them all the best in their new place.

How are we ever going to keep the old colonel down on his farm? Late in February I received a pretty picture card from Jim Tobey showing a sunny patio under some cocoa trees: "I have been in Mexico since January 31, all the way to Acapulco, and go north soon to return to Connecticut late in March. I'm a mere civilian now but am enjoying 19 days leave. My best to you." How he suffers! For his first year as Class Agent, Max is doing a wonderful job on the Alumni Fund. But he can't do it alone; he needs your support. If you haven't already sent him your check, this is a good time to do it and build up our famous old '15 slogan to include "Help Max (too)." — AZEL W. MACK, Secretary, 40 St. Paul Street, Brookline 46, Mass.

• 1916 •

Another April is with us, and for many of us it offers the first opportunity in many months to get out and swing a golf club or a tennis racquet, or perhaps to do a little fishing or sailing. If you are in the group of those who have had a long lay-off from these activities during the winter months, remember that a lot of water has gone over the dam since the days when it was possible for us to go out for the first time in the season and be in top form. Just take it slow and easy for the first few outings.

So that you may keep your class lists up to date, we call your attention to the following changes of address: Freeman Clarkson's new address is Rural Delivery No. 2, Newfane, Vt.; Gonzalo Garita is at Boulevard Virreyes 1110, Lomas, Mexico City, Mexico; Frank S. Hubbard, 3700 Stewart Drive, North Chevy Chase, Md.; Stewart Keith, 1712 Harvard Street, Independence, Mo.; Dr. Richard S. Lyman, Meharry Medical School, Nashville 8, Tenn.; Irving B. McDaniel, 824 South Figueroa, Los Angeles, Calif.; Edward W. Macy, Post Office Box 135, East Rockaway, Long Island, N.Y.; Harry B. Smith, 19 Rowan Road, Chatham, N.J.; Arthur K. Stewart, American Thread Company, Holyoke, Mass.; George W. Tuttle, 48 Hodge Avenue, Buffalo, N.Y.; Norman J. Vile, 39 Highland Street, New Britain, Conn.; Charles Walter, 110-20 71st Avenue, Forest Hills, Long Island, N.Y.

The first letter out of our mailbag is this one from Murray Horwood: "There is really very little of special interest to report. During the past year, I was fortunate to obtain a fellowship from the World Health Organization which enabled me to study teaching, research, and practice in the field of environmental sanitation in

certain western European countries. I was abroad from May 23 to September 6 and after spending four weeks in England, I had two weeks each in Finland, Denmark, Holland, France, and Switzerland. It was a most interesting and rewarding experience and people everywhere were friendly, kindly, and co-operative. There was much of value and of interest to observe in every country but I remember with particular pleasure the fine people I met and the happy human relations that were stimulated in consequence. Mrs. Horwood and our daughter, Charlotte, joined me in Copenhagen and they too reveled in the warmth of foreign hospitality and from the contact with the rich culture of western Europe. Charlotte is a member of the first class of women at the Harvard Law School and had just finished her first year of that long grind. Our son, Sargent, now a senior at Harvard, was also abroad during the summer and toured most of western Europe including Sweden, England, and Scotland in a jalopy with a college friend and had a broadening and happy experience. We met up with the boys in Paris during August and have many happy memories of things we did together. The visit to Switzerland was included in order to report to the W.H.O. headquarters in Geneva. There I also met many fine people and had an opportunity to study somewhat the broad and significant program in public health which W.H.O. is sponsoring in many parts of the world. It was also interesting to see the numerous nationalities working harmoniously and effectively together. It gave one hope and encouragement for the ultimate attainment of a peaceful world. The only other bit of news is to record the arrival of our first grandchild — Louise Pierce Alden — on April 3, 1951. She is nine months old and a source of great joy to parents and grandparents alike. Work at M.I.T. continues to be interesting and absorbing. When teaching is combined with research, with some consulting work, and with considerable community and professional activity, it makes for a very full program indeed. It also makes for a very happy life. I think I have been a very fortunate individual indeed." This certainly is a very interesting and heart-warming letter and it is especially pleasing to learn that life has been so good to you, Murray.

Here's another interesting letter. This one is from Howard Green: "I was so disappointed at not being able to attend the reunion. I had to spend the reunion Friday and Saturday in Washington with one of the census advisory committees, of which I am a member, and drove down to Washington hoping that the committee might finish up in one day and that I could get to the Cape for the tail end of the reunion; but that did not take place. We met Willard Brown and his wife on the turnpike. They were on their way to Europe. I seem to keep very busy all the time. I am still secretary of the Cleveland Health Council, a co-ordinating agency supported by the Community Chest (since 1925). I am also a director of a rather unique, nonprofit agency which collects and publishes local statistics, the Cleveland Real Property Inventory. We are just finishing our 20th annual count of dwellings and families,

stores, manufacturing plants, and so on. These data are published by census tracts and are basic to a sound understanding of the changes taking place in every section of our county which, by the way, has more population than four states all taken together. It is an important manufacturing center; only five counties exceeded this county in value added by manufacture in 1948. I also publish a weekly service *A Sheet-a-Week Prepared by Howard Whipple Green*. I am working on Volume XIX already. That means that more than 936 issues have appeared during the past 19 years. My consulting practice takes up the rest of my paid time, and a whole lot of civic activities fills the remaining chinks. For example, last November my section in the Community Fund drive produced \$68,857 of the total \$6,504,000; and a citizens' committee, of which I was chairman, successfully convinced the voters to pass a county welfare levy, two county bond issues, and a charter amendment to provide funds necessary to produce operating funds for the city of Cleveland. Total money voted up: \$35,000,000. This is my 15th year as secretary of the Cleveland Health Museum which is the only thing of its kind in America. It is the home of the transparent woman and the Dickinson-Belskie models of human reproduction. Our first two granddaughters arrived during the past year. Virginia Katherine Robinson is our daughter's baby. Her husband graduated from M.I.T. in 1924 and stayed around long enough to collect a master's degree. Barbara Boyd Green is my son's baby. He is with Babcock and Wilcox in Alliance and is also trying to get his thesis in shape so as to receive a doctor's degree in metallurgy from the University of Pennsylvania. Mildred and I have been spending our last two summer vacations searching records and cemeteries in Groton, Mass., Rhode Island, and Maine for ancestors. We found that my great-grandfather was born in Wilton, Maine, the 20th child of his father. This had worried me greatly for where would I be if his father had not had 20 children! Hope to be on hand for our next big reunion." Thanks very much for the nice letter, Howard. You seem to be squeezing quite a bit of activity into one lifetime.

Here is an interesting article about Al Simmons which appeared in the *Cleveland News* recently: "Albert Dixon Simmons is adding a typewriter to the equipment which has identified him to outdoor sportsmen for the last 15 years — guns, rods and cameras. Simmons, a Clevelander with a national reputation as hunter, fisherman and camera expert, has been named Outdoor Editor of *The News*. His first column will appear in *The News* sports pages Tuesday, just as he takes off on a jaunt to Arkansas for a duck-shooting, photography and column-writing session. Simmons is a soft-talking gent who decided 15 years ago to make his hobby his life work. He already had turned his back on one profession in his life, so the decision, he says, 'was not too hard to make.' Graduating from . . . Technology with an architectural degree, Simmons deserted the drafting board almost immediately and went into the business of decorative painting. That brought him to Cleveland 25

years ago and here he has stayed. Always an outdoor lover, Simmons had hunted and fished nearly all his years and continued in his spare time. He also became a photography 'bug' and began experimenting with high-speed shots of birds and game. He first took a camera in Public square to 'shoot' pigeons in flight and study their wing action and characteristics, with a half-formed idea in the back of his head. Results were so good that he lugged a Leica or a small movie camera all over Canada and the United States on fishing and hunting trips, constantly looking for more bird-in-flight pictures. In 1936, his hobby paid off when the Derrydale Press published a book of his pictures, titled 'Wing Shots.' It since has become famous as a pioneering work in fast-action outdoor photography. That was Simmons' final break with the painting business and he has followed his camera, guns and fishing rods to every major outdoor sports area in North America in the intervening years. His newest book is *Photography for Sportsmen*, published last year, and he has served on the editorial staff of *Outdoors Magazine*. Simmons' column in *The News* will reflect all the lore, technical skill and sheer love of nature which the author has gained over a quarter century of outdoors activity. It has carried him to Alaska and even to Africa, where he journeyed two years ago as a member of the Cleveland Zoo expedition. During the last 15 years he has built up a set of 18 feature movies of his major trips which have been shown to groups all over Ohio. His photo equipment now consists of three movie cameras and two Leicas, all with gun mounts for action shooting. Simmons lives at 2425 North Park Blvd., Cleveland Heights, with his wife, Mrs. Frances B. Simmons, a member of the faculty at Hathaway-Brown School. Their daughter, Mary Frances, is doing graduate research work on cancer at Wellesley College. Simmons has been a longtime enthusiast and award winner of the Cleveland Bird Club." This is just another example of how diversified the walks of life chosen by the members of the Class of 1916 really are. Perhaps we could persuade Al to join us for the weekend get-together in June and to bring along some of his movies for a private showing to his classmates.

You will recall that in the January issue we called your attention to the fact that Izzy Richmond was in an automobile accident in the fall. Just the other day (early February) we learned that he is coming along nicely and expects to be with us for the week end in June. He is still using a cane and has his leg in a brace but is back on the job on a nearly full-time basis.

We also mentioned in the January issue that Allen Giles was a candidate for the School Committee in Melrose, Mass. You will be pleased to know that Al polled the highest vote. Al must have been like the Pied Piper and used his piano-playing ability to bring the voters into his corner. The following letter from Hy Ullian is just another indication of how avidly our classmates read this column: "In regard to the January article of the class activities, I notice that I was mentioned as having opened another insurance office at Lowell, Mass. In order to keep the records

of the Class straight, let me advise you that I have a cousin with exactly the same name as I have who is in the insurance business. I still am only operating a civil engineering office in Boston and have no such outside activities as the insurance business. I am heartily in favor of having another reunion in the early summer of this year, and if such a reunion is planned, count me in as one of the participants." Please accept our apologies, Hy, and you will be pleased to know that we have written to the Collector of Internal Revenue so that there will be no question of failure to report income from additional sources.

We had the occasion to call upon Harold Russell for a little help on a local project the other day and, as usual, Harold gave us 100 per cent co-operation. He also stated that he was very much in favor of a week end in June and that he definitely would be on hand for such an event. Cy Guething's letter, which follows, also indicates a desire to see the fellows again: "If there is a ball game contemplated for late May, you can count me in. Have an Exeter reunion May 23-24 and could easily go down on the Cape for the following week. Probably some of the 'boys' who missed last year would come this year, and it is later than some think. Wife taking me to Florida soon for remainder of winter. Nice wife."

Ed Weissbach followed up his long letter of last month with this one: "Thanks very much for the class reunion picture of 1951. Certainly we have taken on the appearance of grandfathers and, having taken on that dignity as per enclosed clipping, I can say that without reservation. (Ed. note: The enclosed clipping announced the birth of a son, Edward Christian, on January 23 to Mr. and Mrs. Harry M. Oberholtzer, 3d, of Norristown, Pa., and that Mrs. Oberholtzer is the former Miss Mary Weissbach, daughter of Mr. and Mrs. Edward Weissbach.) The grandson is named Edward Christian Oberholtzer, 'Chris' for short, and his father would like him to go to M.I.T. Frequently the boys have other ideas! We just had a call from a nephew — Herbert Bridge ('50) and family en route from the M.I.T. project at Mt. Evans, Colorado, back to Cambridge. The surprising thing to me is that they were neighbors and worked with Chuck Loomis' son. When they mentioned Chuck, I was puzzled at the familiarity but it developed that that Chuck was the grandson and not our classmate. Your idea of an earlier reunion hits the right chord with me." Since you have now joined the ranks of grandfathers in the Class and since you plan to be at the week-end get-together in June, we will see if we can't arrange to have some sort of an official ceremony welcoming you into the "Grandfathers Club" during the week end in June.

Earl Mellen writes: "After looking at the picture of those attending the 35th reunion, I wish that it had been possible for me to attend. Of course, we have all grown older in the intervening years. I hope that my plans will be such that it will be possible to attend the 36th affair." As Cy Guething wrote, Earl, "It is later than some think!" Your Assistant Secre-

tary feels that a number would enjoy a week end again this June. He definitely is in favor of it and when he called Leonard Stone, Leonard stated that he also is in favor of it. Bill Farthing feels that a week end in June would be a hit with the members of the Class because there are lots of people who usually get back for Alumni Day and would enjoy a get-together.

We have, on the basis of the interest which has been shown to date, gone ahead and made plans for a class reunion in June on the 6th, 7th, and 8th. Alumni Day is on June 9th. We have written to three places on the Cape and at this writing it looks as though we will have the good fortune of getting the Coonamessett Ranch Inn again this year. By the time you receive this issue of *The Review*, we will have the location definitely settled and the details of the plan will have been explained to you thoroughly by a special mailing to each member of the Class. We sincerely hope that as many as possible will be present at this event, not because it is our program and we would like to see it successful, but because it will really be a wonderful week end and represents the change of pace that all of us need at this stage of the game. There has been a great deal of talk about priorities over the past too many months, and for many of us it has meant nothing but headaches; but we are sure that you will agree with us when we say that this June get-together is something that deserves top priority on your list of things to do in future months. Put it in the number one spot and when the big dates arrive, be on hand to say hello to the gang.

We would like very much to see a few more letters than we have been receiving lately. Over a period of months, there have been a number of fellows who have promised to send in letters "in the near future," but deadlines have come and gone many times since the original promise and still no letter. How about it, fellows! — RALPH A. FLETCHER, *Secretary*, Post Office Box 71, West Chelmsford, Mass. HAROLD F. DODGE, *Assistant Secretary*, Bell Telephone Laboratories, Inc., 463 West Street, New York, N.Y.

• 1917 •

Washington is a peculiar center from which to write. There are a great many alleged classmates who are supposed to reside around here, but few are ever present.

We had a 1917 reunion lunch on February 1 and, of 22 invited, only three were able to attend. However, these were most distinguished — Walt Whitman, George Henderson, and the author of these notes. Walt is bearing up well under the responsibilities and frustrations of his job as chief of the Research and Development Board. In fact, he is thriving on it and I feel sure he will not be carried out in the end figuratively, if not literally, on a stretcher, as were his three distinguished predecessors. George Henderson has retired from active duty and is now starting a new, non-Naval career which appears to agree with him. The luncheon was a 100 per cent success. Everyone present decided to attend the reunion.

Our "Admiral Sully" paid us a visit a

few months ago. He is living in Tokyo and represents various engineering companies, notably Foster-Wheeler. He has just acquired a commodious home in Tokyo, so if any '17 men want a place to hole up in Japan, there it is. The house has eight rooms, three baths, a two-car garage, and costs, including land, about \$5,200. Its excellent location, I am told, accounts for part of the expense. Sully is also planning to erect an office building for himself and other businesses. His biggest projects are the erection of urea plants. Opportunities in Japan seem fantastic.

Bill Mehaffey wrote me recently. He has left our area permanently for Harrisburg, where he is assisting the Pennsylvania State Highway Commission. He will try to make the reunion. We were informed by George Washington University that Norman Ames is in Switzerland. Claudius Roberts is now at the Frankford Arsenal in Pennsylvania. Colonel James Doon of Henniker, N.H., has appeared of late in a new light — that of educator. The newspapers had various items on controversy occurring within the structure of the New England College, of which Colonel Doon is vice-president and chairman of the Board of Trustees. A committee headed by Chairman Doon has made changes and installed a new president to operate this veterans' college with the support of the committee of Henniker and its environs. The college is coed and it does not appear that the vice-president lectures at many of the classes. He will submit a full report of his activities at the reunion in June.

Ned Sewall, who is with Oneida, Ltd., writes that his "son, Lex, was married in October, 1951, and, unlike me, does not now have a five-year-old son — as you so brutally put in the class notes 21 years ago." Ned enclosed with this letter one from Homer Ling which we reprint in full, knowing it will be of special interest: "This note will come to you as a big surprise. Having been displaced by the Indo-Japanese war in 1938, I fled to Hong Kong. There I took charge of export of Tung oil to this country to repay the 25-million-dollar loan by Export and Import Bank on behalf of the Foreign Trade Commission. Trapped by World War II before I could get passage for this country and detained by Jap militarists for 18 months. Then escaped to mainland until VJ Day. Served one year in relief work. Before settling down in my old home in Amoy, Communists came in, abandoned home and business, fled to Hong Kong in coastal steamer amidst firing. Came to this country a year ago for recuperation and business plan foiled by Chinese Communist intervention in Korea. Spent last summer and early fall in Maine. Took two trips to Washington to acquaint people in State Department with realistic programs for underdeveloped countries. Much disappointed over their glamorous schemes which have no basic significance in helping people of backward areas to help themselves. Saw Al Lunn in Cambridge. Old professors and acquaintances practically all disappeared. Looked Chambers Mehaffey up in Washington but found he was no longer in active service in the Navy. Got your address from M.I.T. directory and hope this will reach you.

"Since Chinese engineers and scientists are not allowed to return to China by recent decree of the State Department, it becomes necessary for me to look after bread and butter for myself and family. Oldest boy, an electrical engineer, is in England. Second boy is a member of Sigma Xi, civil engineer, mechanics and hydraulic engineer, and now an electronic engineer. He is doing research work in University of Iowa. He is a crack engineer—both in theory and in practice—dextrous with his hands. Youngest boy a student of architecture in Western Reserve. Have recently obtained a job in an electric manufacturing company in New Rochelle. Not very attractive. My wife is with me. Pass on the news if you know any appropriate opportunity. Look forward to having a good, long chat with you. (signed) Homer Ling, The Colony, Apartment 1-U, Larchmont, N.Y." — THOMAS K. MELOY, *Special Correspondent*, Melpar, Inc., 452 Swann Avenue, Alexandria, Va. RAYMOND STEVENS, *Secretary*, Arthur D. Little, Inc., 30 Memorial Drive, Cambridge 42, Mass. FREDERICK BERNARD, *Assistant Secretary*, 24 Federal Street, Boston 10, Mass.

• 1918 •

The precipitate of years of effort and waiting is often an award of some kind. So it was that at the midwinter meeting of the Industrial Furnace Manufacturers Association one of the four national awards went to Professor Frederick H. Norton, Department of Metallurgy, you guess where. Profiting from his father's lectures dealing with heat, delivered in Room 10-250 in the spring of 1916, Ted was among the first in the development of insulating firebrick, now used extensively in furnaces for heat-treating. Thus, for 30 years he has been involved in exalted thinking about high temperatures: for example, furnaces for the firing of special refractories up to 3,300 degrees F. Other accomplishments of Professor Norton include the measurement of high-temperature properties of refractories and the publication of numerous papers on the subject of high temperatures. He is the author of two books: *The Flow of Steel at High Temperatures*, published in 1929, and *Refractories*, published in 1931 (now in its third edition). He was chosen to receive the Trinks Industrial Heating Award because of his outstanding contributions to the development of special refractories and because of his collection, analysis, organization, and publishing of information on refractories. Not to gild the lily, but just to emphasize the years of effort and waiting aspect, Ted was chief physicist for the National Advisory Committee for Aeronautics (1920-1922) and was research director for Babcock and Wilcox Company (1922-1924). He was one of the scientists responsible for the development of Kaolin refractories, is a Fellow of the Physical Society, a Fellow of the American Ceramic Society, and is affiliated with the Atomic Energy Commission in a civilian capacity. In 1949, Alfred University (famous for its course in ceramics) gave him an honorary doctorate. Please address congratulatory correspondence to 90 Revere Street, Gloucester, Mass. And remember, time has to be cultivated to become ripe!

We hear indirectly that Sax Fletcher, now President of Ross Engineering, has been frantically busy this year consolidating the two Ross companies (United States and Canadian, I think). He's a modest soul, bearing the executive's burden with humility and force, which is why the details are scarce. We suppose he finds strength for these things by periodic jaunts to his dairy farm in New Hampshire where, after a long, hard week at his New York office, he restores optimism and faith by coming to anchor beside a contented cow. Don't think cows are subservient and without spirit, you city slickers. Mistreat a cow and she not only becomes resentful but dangerous, sometimes to the point of cold murder. Establish a good association with a gentle bovine and you'll never charge the cape instead of the matador.

And that's all the epigrammatic wisdom at this time except for one thing: We have a reunion a year from June. Many of the classmates feel that our happiest reunions have been held at George Grandi's Weekapaug Inn. If you have any preferences in the matter please let me know at once, for reservations need to be made at least a year in advance. — GRETCHEN A. PALMER, *Secretary*, The Thomas School, The Wilson Road, Rowayton, Conn.

• 1919 •

Fred J. Given has advised that, as of February 1, his new position and address will be: Director of Apparatus and Materials Engineering, Sandia Corporation, Sandia Base, Albuquerque, N.M. This is one of the companies in the Bell System family, where he has previously been employed; but he will be taking up quite a different line of work for some time to come. He would certainly appreciate hearing from any of the classmates or seeing anyone who may be in the vicinity of Albuquerque. We all join in wishing Fred lots of success in his new endeavors.

Harold F. Marshall writes that there is nothing new to report at this writing. Received a card recently from Warren Maynard advising that both his sons are now married: John (M.I.T. '46) has two daughters and Bob (Boston University '49) was married in June, 1951. Warren and Mrs. Maynard have now taken an apartment in Cambridge, after residing 29 years in Winchester, Mass. He is still connected with the New England Telephone Company. He had quite a reunion with George Irwin, whom he met at Atlantic City, and they are both looking forward to our 35th reunion in 1954.

J. W. Meader has advised that his son John W., Jr., has now returned to Yale after a year's absence because of an automobile accident in November, 1950. His daughter, Vera, is now at Smith College after two years at Art Students' League in New York. Ed Moody writes that he has now transferred all operations to Nashua, N.H., and now calls himself "The Town Blacksmith." His firm, Edward G. Moody and Son, Inc., manufactures and fabricates steel tanks, truck tanks, and specialties. We extend our best wishes for his continued success. A recent note from James R. Moore, of Providence, R.I., advises that he is still a "cotton yarn broker."

— EUGENE R. SMOLEY, *Secretary*, The Lummus Company, 385 Madison Avenue, New York 17, N.Y.

• 1920 •

At the midwinter alumni meeting in Boston, which had a record turnout this year, the Class of 1920 helped to set this record by turning out in goodly numbers. Present, in addition to the Wason twins and the Bugbee twins, were Bob Patterson, Phil Wait, Herb Federhen, Ed Ryer, Fred Britton, Ernie Huntress, Joe Hennessy, Harold Bibber, and John Lynch. They had reserved a couple of tables for us so we had a good informal class reunion as well as a good M.I.T. gathering. Ernie Huntress, by the way, has recently authored an article published in the *Proceedings of the American Academy of Arts and Sciences*, January issue.

The secretary of the M.I.T. Club of South Florida thoughtfully sent us a clipping from the *Miami Herald*, containing the news that Morris Lipp has been made assistant city manager in addition to his job as city engineer. Morris has been an employee of the city of Miami Beach for more than 25 years. There was a very good picture of Morris in the newspaper and I can tell you that he hasn't changed much. Your classmates congratulate you and are proud of your success, Morris! Frank Maconi has been made superintendent of the Norwood Flooring Plant of Bird and Son, Inc. Frank, who was formerly with Graton and Knight Company in Worcester, became associated with Bird and Son last June.

George Anderson is in Silver Spring, Md., address 1576 East-West Highway. Major Samuel Milliken is now in Bar Harbor, Maine. Mel Powers has moved from Bronxville, N.Y., to Kingston, N.Y., address 322 Albany Avenue. Aaron Bradshaw has been promoted to major general and is with the Logistics Division at the European Command Headquarters. Hank Couch is now president of the Rochester M.I.T. Club. His address is 3861 Elmwood Avenue, Rochester, N.Y. Colonel Austin Higgins is now at Ft. MacArthur, Calif. Frank Lawton is with the Texas Company in New York City. Dr. Andrew J. McGowan is in Ozone Park, N.Y. Henry Prescott has left Franklin, N.H., and is in Northfield, Mass. If I had known that sooner, I would have looked him up when Perc and I were at the Northfield Inn for a few days in February. Perc is telling everybody that he was up there for the international ski jumping at Brattleboro, but I can assure his classmates that he never left the ground and didn't put on anything more lethal than skates. — HAROLD BUGBEE, *Secretary*, 7 Dartmouth Street, Winchester, Mass.

• 1921 •

Daniel P. Barnard 4th, research co-ordinator of the Standard Oil Company (Indiana), was honored by the Society of Automotive Engineers by election to its presidency at the annual meeting in Detroit last January. With Glenn Stanton as president of the American Institute of Architects, there are two members of the Class who head leading national professional societies for the current year. Dan

has spent years in matching fuels and internal-combustion engines, winning the S.A.E. Horning Memorial Award in 1949 for distinguished service in this field. He is the author of many technical articles and is a member of the American Chemical Society, American Society of Mechanical Engineers, Institute of Aeronautical Sciences, Wings Club, and Kappa Alpha Fraternity. After graduation from Delaware in chemical engineering in 1919, he obtained his master's degree with us in Course X, then the doctorate at Technology in 1928 and the degree of chemical engineer from Delaware in 1932. Prior to going to Standard Oil as assistant director of research in 1925, he had been division director in the Research Laboratory of Applied Chemistry at M.I.T. In 1938, he became associate research director of Standard Oil and in 1948 was made research co-ordinator. He is also president and a director of the Coordinating Research Council, chairman of the automotive research committee of the American Petroleum Institute's division of refining, and a member of the subcommittee on aircraft fuels and lubricants of the National Advisory Committee for Aeronautics. His headquarters are in Chicago and he makes his home in Chesterton, Ind. He and Mrs. Barnard have a married daughter, Edith, who was graduated from Northwestern; a son, Daniel P., 5th, who has bachelor's and master's degrees in chemical engineering from Delaware; and a grandson, Daniel P., 6th, who was born in 1950.

Lawrence W. Conant is mobilization planning officer in the Office of the Chief of Engineers, U.S. Army, Washington, D.C., and a member of the Society of American Military Engineers. He is a founder and director of Dad Coached Clubs, Inc., and the newly-formed national "Jets" organization for fathers and sons. Larry and Mrs. Conant have three sons and a daughter. Bill, M.I.T.'48 and Michigan, is with the District Engineers Office in Anchorage, Alaska; George, Amherst, is with the Aluminum Company of America; Peggy was graduated from Pembroke last June and married two days later; Spicer is in grade school in Washington. Richmond S. Clark is co-ordination division head with the Humble Oil and Refining Company, responsible for planning and scheduling refinery problems at the Baytown, Texas, plant. Rich and Mrs. Clark have a son, Richmond S., Jr., University of Texas, who is now in the U.S. Coast Guard. Percival B. Crocker is manager of the Sentry Company, Foxboro, Mass., a director of the Foxboro National Bank, the Foxboro Federal Cooperative Bank, the Foxboro Service Company, and the Lawson Products Company of Pawtucket, R.I., and a member of the American Society for Metals. He and Mrs. Crocker have three children: Ann, who is a graduate of Vermont; and Marion and Bristol, both of whom are graduates of Maine. Marion is married and has a two-year-old son.

Reginald H. Smithwick, chief surgeon of the Massachusetts Memorial Hospital, professor of surgery at Boston University and internationally-known for his extensive research on nerve surgery, has written

an article for the *Journal of the American Medical Association* on the notable reduction of the death rate due to high blood pressure which has been achieved by surgery. An article in the Lynn, Mass., *Republican* says that Reg is coauthor of a book entitled *Autonomic Nervous System* and a leading authority on high blood pressure, named in 1949 as a member of a special Massachusetts commission to make a study of the disease. Reg is also affiliated with the Massachusetts General and Beth Israel Hospitals in Boston and the Anna Jacques Hospital in Newburyport, Mass. Stewart P. Coleman is a director of Standard Oil Company (New Jersey), the Arabian American Oil Company, and the Trans-Arabian Pipe Line Company, with headquarters in Rockefeller Center, New York. He is a member of the American Petroleum Institute, American Chemical Society, American Institute of Chemical Engineers, and the American Association for the Advancement of Science. Besides authoring numerous papers for oil industry journals, he wrote a chapter of *Elements of the Petroleum Industry* for the American Institute of Mining and Metallurgical Engineers. Stew and Mrs. Coleman make their home in Cedarhurst, N.Y., where their two young daughters attend the Lawrence School. Frederick J. Curtin heads the Curtin Engineering Company, general contractors, 610 Virginia Park, Detroit, Mich. He and Mrs. Curtin live in Freeport, Ohio, and have a married daughter, Jean, who was an honor student at South Shore Business Institute. A grandchild, Leslie, is five years old.

Lawrence B. Richardson, a retired rear admiral and now Senior Vice-president and Director of the Electric Boat Company, is the outgoing president of the Institute of Aeronautical Sciences. S. Paul Johnston, Director of I.A.S. and himself a former Naval captain and holder of the Legion of Merit, has written an appreciation of Larry's service in the January *Aeronautical Engineering Review*. Your Secretary had the pleasure of introducing to the M.I.T. Club of Northern New Jersey an associate in the International Telephone and Telegraph Corporation, Robert A. Vogeler '37, who spoke at the February dinner meeting on his 17 months in a Communist prison in Hungary. Seen at the dinner were Mor Aronson, Mr. and Mrs. Sumner Hayward, and Joe Wenick. On the occasion of a visit to Erie, Pa., to deliver a paper on the "Intelix Automatic Ticket Reservation System" to the local section of the American Institute of Electrical Engineers, your Secretary enjoyed a trip to the General Electric locomotive works but missed seeing Phil Hatch who was away on business. Ray and Helen St. Laurent were welcome visitors to Baghdad on the Subway and we were glad to hear from George Chutter on one of his trips to his New Jersey office. Ray says he spent an evening recently with Paul Rutherford, who is general manager of the Delco Appliance Division of General Motors in Rochester and a director of one of the large Rochester banks. Nancy Rutherford is a senior at Northwestern; Alice has been married for several years and lives in Detroit.

William R. Hainsworth, formerly Vice-

president of Servel, Inc., in charge of engineering and recently promoted to staff consulting engineer, has left the New York area and makes his home on Mt. Auburn Road, Evansville, Ind. George O. Hartman is now with the shipbuilding division of Bethlehem Steel Company, 3075 Richmond Terrace, Staten Island 3, N.Y. Edward P. Wylde, owner of the Harbor Machine Company, Adams, Mass., has a new home on Bee Hill Road, Williamstown, Mass. New addresses have been received for Frederick S. Dellenbaugh, Jr., Richard McKay, Meade A. Spencer, and Harold F. Stose. Saul M. Silverstein, President of Rogers Corporation of Manchester and Goodyear, Conn., Vice-president and a founder of the First National Bank of Manchester, and guiding light of Manchester's ten-million-dollar school building program, has been elected a trustee of the Eastern States Exposition, which holds an annual fair at West Springfield, Mass. Richard W. Smith, formerly assistant manager of the natural resources department of the National Chamber of Commerce, has been named department manager. Dick makes his home in Washington, D.C., and says he frequently sees Elliott B. Roberts, a captain in the U.S. Coast and Geodetic Survey. Gordon M. Leland is administrative assistant to the chairman of the New York State Housing Commission and lives at 72 Barrow Street, New York City.

It is with deepest sorrow that we record the passing of two members of the Class and extend sincere sympathy to their families. Douglass Edwin Brown, a well-known water-color artist of New York and Washington, D.C., died in a Washington hospital on January 4, 1952. Born in Coldwater, Mich., in 1900, he was associated with us in Course X and later was graduated from Harvard in engineering but abandoned it for painting some 25 years ago. He had traveled extensively in Mexico, Haiti, and Guatemala, specializing in landscapes and scenes of native life. His home was in New York City but he lived in Washington intermittently in the last 10 years, teaching art in the Capital and in Virginia and exhibiting in numerous Washington shows. Last fall he gave a private one-man show at the Washington Arts Club and currently had a painting on display at the Corcoran Art Gallery. He was a member of the Washington Society of Artists, Washington Water Color Club, and Washington Artists Guild. Surviving are his wife, Mrs. Freda Brown, a daughter, Stephanie Brown of New York, three sisters, and a brother. Hunter Everette Gardner died in a Hollywood, Calif., hospital on January 16, 1952. A stage, screen, and television actor-director, he was born in Ft. Worth, Texas, in 1899 and lived there at different times until moving to Hollywood three years ago. With his late mother and a sister, Mrs. Rosalind G. Shelley of Ft. Worth, he built Ft. Worth's first Little Theatre in a barn behind the family home. After working in the theater as managing director for several years, he went to New York and played on Broadway with Jane Cowl, Ethel Barrymore, and Ina Claire. At one time he served as director of the Jesse Bonstelle stock company in Detroit. In Hollywood, he was

connected with television and motion-picture acting and directing. Surviving besides Mrs. Shelley are another sister, Mrs. M. P. Brown of Ft. Worth; and two daughters, Mrs. F. A. Chromister of Little Rock, Ark., and Mrs. Achille Doshier of Amarillo, Texas. We are indebted to Si Freese of Freese and Nichols, Ft. Worth hydraulic and sanitary engineering consultants, and to Miss Irene Walker of the M.I.T. Alumni Register for these biographies.

Reminder: You and your family are invited to the annual class party at the Hotel Statler on the afternoon of Alumni Day, Monday, June 9, 1952, following the program of events at Cambridge and prior to the evening banquet.—CAROLE A. CLARKE, *Secretary*, International Standard Trading Corporation, 67 Broad Street, New York 4, N.Y.

• 1922 •

Our 30th reunion is now definitely planned for Friday, Saturday, and Sunday, June 6, 7, and 8, at the Sheldon House, Pine Orchard, Conn. Ray Rundlett is chairman of the reunion committee, and he and his associates have been busy for some time arranging all details. Notices giving all details will be sent to all members of the Class. Since the capacity of the Sheldon House is limited, your Secretary suggests that it would be very desirable for those who are definitely planning to attend to send their reservations to Ray at once.

Donald F. Warner, the distinguished jet-engine designer, long with the General Electric Company in Lynn, died on February 12 at his home in Marblehead, Mass., at the age of 53. Warner was a member of the National Committee on Aeronautics, the Aeronautical Association, the American Society of Engineers, the Society of Automotive Engineers, and the National Society of Professional Engineers. He leaves his wife, a daughter, a brother, and two sisters, to whom the Class extends its sympathy. Hugh D. Haley, an engineer with the American Viscose Corporation, died on February 8 at home in Drexel Hill, Pa., at the age of 51. Prior to joining American Viscose, Haley was production manager for motors at the General Electric Company in Lynn. He was an inventor of some note. He was a member of the American Institute of Electrical Engineers and the Society of Plastic Engineers. He is survived by his wife and a daughter. The Class extends its sympathy to them. Edith T. Sears of Marshfield Hills, Mass., died during the summer of 1951. George D. Ramsay of Southern Pasadena, Calif., died September 8, 1951. Harry Gilbert, President of Harwid Company, Cambridge, died on January 14. No other information is available at the moment as to the circumstances surrounding the deaths of Miss Sears, Mr. Ramsay, and Mr. Gilbert.

New Addresses: Richard J. Sholtz, 401 East 72nd Street, Kansas City, Mo.; Harold N. Loomer, 1189 Great Plain Avenue, Needham 92, Mass.; Platt C. Benedict, Post Office Box 366, Jerome, Ariz.; Herbert C. Ham, 116 Pollock Avenue, Pittsfield, Mass.—C. YARDLEY CHITTICK, *Secretary*, 41 Tremont Street, Boston 8,

Mass. WHITWORTH FERGUSON, *Assistant Secretary*, 333 Ellicott Street, Buffalo 3, N.Y.

• 1923 •

Make your plans now to be at the annual meeting of the Class on Alumni Day, June 9, 1952, in Boston. A short class meeting and get-together will be held in a room reserved at the Boston Statler at about 5:00 P.M., so that those who wish can attend the alumni dinner following the class meeting. We have had very pleasant get-togethers in these annual sessions, and at the meeting this year the further plans for our 30th reunion will be developed.

The midwinter meeting of the Alumni Association on January 31 at Walker Memorial was well attended by 1923 men, some of whom had young guests with them in accordance with the custom. I did not not make a list, but among those present were R. D. Brown, Harry M. Chatto, Joseph Fleischer, E. Louis Greenblatt, O. L. Hooper, W. T. Howland, J. A. Pennypacker, Paul Plant, and D. W. Skinner.

President Bob Shaw has reported the death of his father in December, after a second heart attack. Those who have attended reunions and class gatherings in recent years will remember "Pappy" Shaw. Bob remarked that he thought the members of the Class had always been very nice to him and that "Pappy" liked them all very much. He was 83 years old at his death and had been prominent in church, masonic lodge, and civic affairs in Bath, Maine, for many years.

W. L. Stewart, Jr., Executive Vice-president of the Union Oil Company of California, sent me a card about the new research center established by the Union Oil Company in Brea, Calif., and at which an open house was held in February. I had a card from José Carlos Bertino, retired commander and naval engineer of the Argentine Navy and professor of marine engineering at the University of Buenos Aires. Bertino has succeeded Luis A. Igartua '23 as president of the M.I.T. Club of Buenos Aires. He said the club celebrated, on November 15, the last meeting of 1951 with a lunch for members and ladies. The particular occasion was to say goodbye to Mr. and Mrs. Frederick T. Entwistle who are returning to the United States. Entwistle has been production manager of "Ducilo," S.A., Productora de Rayon. I had lunch recently in Boston with Charles H. Ducoté. He has retired from service in the United States State Department and is recently back from his last post at Tananarive in Madagascar.

Henry B. du Pont, Vice-president of E. I. du Pont de Nemours and Company, said some things which badly need to be said to the widest possible audience, in a talk on January 24 before the annual meeting of the Baltimore Association of Commerce. He spoke under the intriguing title, "Power—Horse or Unicorn?" warning that the nation, at a time when its defenses call for an industrial team bigger, stronger, and more unified than ever, is in danger of losing the power to create capacity for low-cost mass production because of fear of mythical economic

powers attributed to big business. The unicorn, a mythical animal, symbolizes the mythical power of big business. He pointed out, as a practical fact, that big business does not have power it is sometimes thought to have to drive small competitors out of business, to squeeze the public with high prices, or to make money all the time. The real power of big business, he says, is the power to risk huge sums of money on the possibilities of a return, to undertake large-scale research projects, and to create the productive capacity which marks our high standard of living and which can be produced only on a large mass-production basis.—HORATIO L. BOND, *Secretary*, National Fire Protection Association, 60 Batterymarch Street, Boston 10, Mass. HOWARD F. RUSSELL, *Assistant Secretary*, Improved Risk Mutuals, South Broadway, White Plains, N.Y.

• 1924 •

At the Cambridge midwinter meeting in February, '24 had a goodly turnout. Long-distance winner was Frank O'Neil, on from Chicago to visit his son, a senior at the Institute. Alumni are encouraged to bring their sons to this affair. Among those who accepted the invitation were Harold Hazen, Frank Shaw, Larry Novack, and your Secretary. In late February, the New York Silver-Stein Dinner was held, but as we go to press no details are available, except that Pret Littlefield gave assurance before the fact that we would be well represented.

A report from Paul Cardinal indicates that his Cuban trip was eminently successful. Mike Amezcaga really showed the Cardinals the town. Paul gets practically lyrical in recounting it—"The dancing at San Souci under the stars and palm trees," where he tried some of his Cuban dance steps (à la Nutley, N.J.), cocktails at the Havana Biltmore Yacht Club, and char- treuse and Cointreau at the Country Club. No mention anywhere of whether Paul even tried to sell any vitamins. However, he probably needed some himself when, after taking off in 80 degrees, he landed at home that night in five inches of snow and 20-degree weather!—President H. Gregory Shea, of the New York State Society of Professional Engineers, made the *Times* recently under the heading, "Engineering Skill Held Laxly Used." President Shea stated that engineers do too much routine and clerical work, and that if they confined their efforts to engineering thinking, directing, inspection, and conference, two could do the work for which four are now needed—with appropriately higher pay rates of course. Sounds like the sort of message that would appeal to his constituents.

We promised some time back to give you some more news on Mrs. Frances (nee Bliven) Whedon, subject of a recent syndicated column profile: "Blue-eyed, mild-mannered Frances Whedon, who studied voice and piano and was expected to take up a musical career, very early showed an interest in things mathematical and was graduated in the Class of '24 from M.I.T." After a period at Langley Field's wind tunnel, she took time off to "raise a daughter and bake angel food cakes" (sounds like a rather one-sided diet), and in 1942

went to work for the Signal Corps. Since that time Mrs. Whedon has worked on instrumentation of rockets and upper atmosphere research in general. She is the Signal Corps' only woman meteorologist.

William F. Donovan, Jr., who has been in Toledo for the past 20 years and more, has suddenly turned up in Boston. No information yet, but we'll try and track Bill down and let you know how come. Current issues of *The Tech* carry a familiar name. Sarkis Zartarian, Jr., '52, appears there with some regularity. He's a standout marksman on the Institute's standout rifle team. Latest Alumni Fund figures show that we're doing all right this year. Our total of \$4,000 on February 1 was only \$500 less than what we gave the entire year of 1949-1950, and put us up in the top five of all classes. Not so good in numbers, however. Still 160 of last year's contributors who haven't been heard from. Let's hope this will have changed by the next issue. Frank Shaw has a letter going out to try and do something about it. — HENRY B. KANE, *General Secretary*, Room 1-272, M.I.T., Cambridge 39, Mass.

• 1925 •

The fact that your Secretary has been engaged in civilian defense work in his home town of Braintree, Mass., is all that kept us from drawing a blank in the newspaper clipping department during the past month. In Braintree we have a group of juniors and seniors from the high school with whom your Secretary has been working in the field of radiological monitoring. These youngsters are interested and enthusiastic about the program and take this whole matter of civilian defense much more to heart than most of the adults. Of course, as many of you realize, the country's civilian defense program is not moving as rapidly as it should and it appears that much of the difficulty stems from the very top in the Federal civilian defense program. The *Boston Traveler* gave the Braintree group a fine write-up. The number of youngsters involved, by coincidence being 11, the *Traveler* indicates that the most important "eleven" at Braintree High School is no longer the football team but the group working in the field of radiological monitoring.

The Class of '25 was well represented at the annual midwinter meeting of the Alumni Association held at Walker Memorial on January 31. We had by far the largest number which has represented our Class at any of these meetings, and this speaks well for the enthusiasm started with our 25th reunion and continued through the efforts of Ave Stanton. The following were present: Ave Stanton, XV, Frank Turnbull, II, L. T. Gregory, XV, W. N. Westland, I, Robert Hodson, II, Fred Greer, II, Ed Kussmaul, VI-A, G. M. Houghton, VI-A, Courtenay P. Worthington, I, W. F. Arnold, XV, Tod DeFoe, IX-B, Arnold B. Bailey, XV, Frederic M. Rice, I, Wally Squire, II, Samuel Glaser, IV, Cy Hosmer, Jr., XV, Mac Levine, II, Ed Cousins, I, Ed Murphy, X, Ed Lynch, VI-A, F. B. Kent, and yours truly. — F. LEROY FOSTER, *Secretary*, Room 5-105, M.I.T., Cambridge 39, Mass.

• 1926 •

It may be April in these notes but it sure is February as we write — Sunday morning, February 17th, to be exact — with a howling nor'easter spitting snow and spindrift against our windows here at Pigeon Cove. I suppose you wonder why we are here on such a week end. Sometimes we wonder, too; but it seems to get in one's blood. Also, just to make you envious, the fishman just delivered a pound of fresh open lobster meat from lobsters landed just before the storm started last night. As we write the notes, it is a nice diversion to reach for a knuckle or piece of claw meat. By the way, if any of you really like lobster, there is an outfit that ships to restaurants countrywide called the Boston Lobster Company at 130 Northern Avenue in Boston which you should know about. If you are ever throwing a party where you can use a minimum of 20 pounds of live lobsters, they will ship them by express, iced in a special container so that you will get them on the day of the party, as fresh as what I am now eating. The price varies with the express charge, but it generally figures around a dollar a pound. (We have no shares in the company, don't even know the guy who owns it, but do know that it is a good outfit.)

One of the next biographies that we were to include among our thumbnail sketches was that of Irvin L. Murray who filled out the form last June at reunion. A clipping sent us by Jean Leinroth, Jr., '48, Secretary of the M.I.T. Club of the Kanawha Valley, brings us sad tidings. On January 9, Irv succumbed to a heart condition at the McMillan Hospital in Charleston, W.Va. Irv was chief process engineer of Carbide and Carbon Chemicals Corporation at South Charleston and had long been active in affairs of Kanawha Valley chemists. He served as a member of the American Rubber Mission to the Soviet Union in 1942 and 1943 and was a director (1949-1951) of the American Institute of Chemical Engineers. We express deep sympathy to Mrs. Murray and Irv's stepchildren, Noel and Carrol.

We still have a substantial number of thumbnail biographies received at reunion last June, so why don't we run off a few of them. You probably noticed last month that we started to condense a bit. If we are to ever get through the Class, these shorter biographies will be necessary. We are now up to 25, so let's try to knock off 10 more this month.

No. 26 — CHASE, EUGENE A. — Chip Chase was in Boston on business last Friday and gave us a ring so we decided to dig out his biography first while it was fresh in our mind. (We are going to call him Gene. Chip doesn't exactly go with the name Chase, or does it?) Anyhow, Gene is an attorney for Sterling Drug, Inc., with the title of house counsel. Office is 1450 Broadway, New York City, and home, 819 Red Road, Teaneck, N.J. We were glad to have Gene clear up for us what Sterling Drug is, because his company's name, as such, is not well known to the public. Sterling, however, owns a lot of well-known outfits such as Bayer Aspirin, Phillips Milk of Magnesia, Koly-

nos toothpaste, and so on, and even a dyestuffs manufacturer, Hilton Davis Company. Gene worked for Du Pont immediately after graduation, and, since 1928, has been assistant treasurer of Shawmut Corporation of Boston, manager of a New Hampshire knitting mill, three years in Wall Street, and finally entered private practice as an attorney in 1937. He joined Sterling in 1945. Gene has two sons, 23 and 20, the latter in the Army. Sorry that our telephone conversation was not longer because I'm still trying to figure out how he became an attorney with such a busy career.

No. 27 — CUNNINGHAM, DONALD S. — Don is plant manager of Hersey Manufacturing Company in South Boston, manufacturers of water meters. Upon graduation, he went with Gilbert and Barker Manufacturing Company (Standard Oil of New Jersey) for a year and a half and then joined Hersey, becoming plant manager in 1936. Don's activities have been confined to Community Chest and other organized charities. He enjoys sailing and gardening. Don is always on hand at local M.I.T. gatherings and has helped in every reunion and other '26 affairs. He is one of the local '26 men who is always ready to give a hand. Don is married; has no children.

No. 28 — RICHARDSON, BENJAMIN P., JR. — Ben lives at 4 Fairgreen Lane, Old Greenwich, Conn., where he is located with Electrolux Corporation, doing engineering and development work. He stayed on in 1927 and got his M.S. and then spent a year on active duty in the Naval Reserve as a pilot before joining Electrolux. Ben is married, has two daughters — one in college and the other married.

No. 29 — STAPLES, ELTON E. — In looking over Elton's record, it is hard to believe that he left New England 12 years ago, because he was one of the local gang for so long. He is now located with Hevi Duty Electric Company in Cleveland as vice-president in charge of sales. Elton went with Hevi Duty in 1940 after spending the previous 10 years in New England with Gulf Refining Company. During the War, Elton spent four years in the Army winding up as lieutenant colonel in charge of procurement of general supplies Q.M., E.T.O. Elton has given us a record of his weight over the years which started in '27 at 152 pounds (your Secretary weighed 155 pounds then, but Elton is six feet, or one and one-half inches taller). In 1931, he was 150 (Secretary was 170). In 1945, Elton was 155 (Secretary, 180). In 1951, it was 167 versus 170 for your Secretary. After 25 years, Smith still weighs three pounds more than Staples and that must prove something. Elton's wife, Miriam, graduated from Radcliffe in 1926 and they have three boys: James, 23, who graduated from M.I.T. last June, Samuel, 19, and Charles, 14.

No. 30 — SAWYER, S. P. — Stan is an electrical engineer with the Fitchburg, Mass., Gas and Electric Light Company. He has stuck close to electrical engineering over the years, mostly with public utilities and mostly in New England. His current activities also cover the New Hampshire utilities at Concord, Exeter, and Hampton. Stan's family consists of his

wife, Grace, and a son, Paul Stanley, who is seven.

No. 31 — SMITH, RALPH E. — Ralph lives at 1320 Huntingdon Road, Abington, Pa., with his wife, Millicent (Smith, 1931); son, Douglas, 15, who is six feet, four inches (Dave Shepard please note!); and daughter, Sandra, who is 12. Ralph has been with the Aluminum Company of America since 1928, except for two years spent in Australia in 1939 and 1940. At present he is district representative in the Philadelphia area. We have an excellent Kodachrome flash shot of Ralph taken at reunion. Will save it for our 30th.

No. 32 — SHERWOOD, R. W. — Bob Sherwood is the classmate from Texas who appeared with the ten-gallon hat at reunion. He is located at Beaumont as superintendent of design for Gulf States Utilities Company. Over the years, Bob has been in the utility field in Seattle, Wash., Ponce, Puerto Rico, Lake Charles, La., and Beaumont. He was a member of the Standards Committee, American Institute of Electrical Engineers, for 1950 and 1951, and secretary of the local chapter for 1951 and 1952. Bob has two boys: Robert, Jr., 18; and John, 15. Their summer place at Lake Charles occupies all spare time except during football season.

No. 33 — SPEAR, R. GORDON — Gordy has been with General Motors long enough to have been awarded a gold watch last December for 25 years of service. He is sales engineer for Fisher Body and is located at Detroit. His home is at 3416 Edgewood Drive, Route 1, Walled Lake, Mich., which, if our memory is correct, is about 25 miles from Detroit and, of course, Gordy drives it. Gordy has been very active in Detroit M.I.T. affairs, having been treasurer, secretary, vice-president and twice president of the Detroit M.I.T. Association. During the development drive he was of course extremely active. On the form, Gordy states that his hobbies are golf, music, and so on, but we also recall that when vacationtime rolls around he and his wife get into a General Motors automobile and really cover some territory.

No. 34 — SUTTER, DAVID M. — Dave is also from Detroit and he arrived at reunion last June with Gordy. Dave is a manufacturers agent, having started this business in 1931. He also has been active in Detroit M.I.T. affairs, having been president of the Detroit Association in 1946. Dave also was chairman of the Detroit area committee of the M.I.T. Development Fund. He likes music and he enjoys sailing, too. Dave is married and has a son (M.I.T., Class of '50) and a daughter, 18.

No. 35 — UNDERWOOD, ARTHUR F. — I really didn't plan it, but unconsciously seem to have picked the Detroit crowd for this month's write-ups; but what's the matter with that? Art is another General Motors man, being head of mechanical engineering at the General Motors Research Laboratories. He started in the G.M. labs in 1928 on engine research and took over his present work in 1937. His department's activities are rather broad, ranging from Diesel development to a heart pump, which is currently being tried on dogs. Art has a 19-year-old

daughter who is currently attending college. His address is 722 Rivard Boulevard, Grosse Point, Mich.

(Since I write this stuff all in longhand and have been going for three hours steady, there is some danger of getting writer's cramp. However, let's get one more biography down before quitting.)

No. 36 — WALTER, MARTIN, JR. — Marty has been making rope in New Bedford, Mass., for 25 years and a couple of years ago was made president of his company, the New Bedford Cordage Company. We wrote up a rather complete story at that time. However, we had none of the family story, so here it is — and we are quoting from a letter Marty wrote us: "I am married and have two kids; Sally, who is 16 and has my good looks and terrible disposition; Martin, 3d, who is 13, redheaded, and has his mother's delightful disposition." Marty and his family live at 131 Court Street in New Bedford.

And that seems to do it for the month, except that we had a nice letter this month from Nelson Wilmot which we shall quote verbatim: "It would be difficult to express the appreciation that I have for the effort you put into our class reports; let me simply say that they are most interesting. Your report on Stan Cheney was particularly of interest as we had gone through Andover together, but I have had no word of him for many years. It has not been my pleasure to see any of our '26 gang here recently. Possibly the coming of spring will allow us to circulate a little more freely. (Signed) N. F. Wilmot, District Sales Manager, Mathieson Chemical Corporation." Now we did not quote Nelson because of the bouquets, but because it showed that someone reads the notes. If anyone will send a brickbat letter, we will publish that, too; but any kind of response will really help us to know that some of you out there are reading the notes, and criticism of any kind will be really welcome. — GEORGE WARREN SMITH, *General Secretary*, E. I. du Pont de Nemours and Company, Inc., Room 1420, 140 Federal Street, Boston, Mass.

• 1927 •

Plans are going ahead rapidly for the 25th reunion to be held June 6-8, 1952, at Oyster Harbors Club, Osterville, Cape Cod, Mass. We are expecting an attendance of 150 and all of you who have not yet decided to be present are strongly urged to complete your plans to attend this once-in-a-lifetime event. Concurrently, the 25th Reunion Year Book is being put together and it looks like something that all of you will want, whether or not you can make the reunion itself. More on this subject in later class notes.

An item in the Portland Sunday *Telegram* indicates that Charles A. Bartlett of North Yarmouth has announced his candidacy for Cumberland County attorney. A Portland lawyer, he once served Portland as a state representative. He conducts a radio program heard weekly since July, 1949. His conception of the county attorney's function includes protection of the innocent as well as prosecution of the guilty. Recently elected president of the Portland Masonic Club, he is active in Masonic affairs.

The guest speaker at the Hancock Church Men's Club in January was Robert G. Dexter. He presented colored motion pictures of unusual automatic machinery performing a variety of operations on familiar products. The movies were accompanied by a nontechnical lecture describing why such machines are seldom seen by the public. Mr. Dexter is a member of the firm of Barkey and Dexter, development engineers of Boston, and has had extensive experience in the aircraft industry and in the development of automatic machinery. Henry D. Johnston was elected to the board of Strathmore Paper Company of Springfield, Mass. Mr. Johnston has held various positions with the company since his graduation from M.I.T. In 1929 he was appointed assistant to the vice-president in charge of production. In 1948 he became assistant to the president.

A note from Fred Glantzberg tells us that he has been transferred to Kirtland Air Force Base at Albuquerque, N. M., to form a new command: "Although I guess I should be quite flattered, Claire and I are very sad to be leaving Savannah where we have spent a very happy three years and are leaving behind many wonderful friends." Fred plans to come to the reunion. He asks: "Do we have any classmates in the Albuquerque area?" Eddie Cahill writes to tell us that after 17 years in the geological department of Skelly Oil Company, Tulsa, Okla., he resigned in order to enter consulting work. His work keeps him at various district offices throughout the mid-continent area, including Tulsa, Wichita, Shreveport, Evansville, Guymon (Okla.), Midland, Hobbs, and Carthage. His work has been confined chiefly to geological problems in the Illinois Basin oil province.

Jerry Donovan is leading the life of a pseudo farmer since his retirement from the Navy and is living in his own home in Weston, Conn. He is greatly interested in the affairs of the community and also in the cause of the deaf, because of his own daughter's deafness. He has just been elected to the board of directors of the Volta Speech Association which is devoted to the improvement of the education of the deaf. He is most busily engaged in trying to keep up with his five young children after being away a good deal during their early childhood. Charlotte, 16, goes to boarding school in Greenwich; Jerry, 15, is at Andover; Arthur, 13, intends to go there next year, and is at present in local school, as is Laurence, 9. Mary, 8, goes to a school for the deaf in St. Louis, so it all adds up to a life on the road. — JOSEPH S. HARRIS, *Secretary*, Shell Oil Company, Inc., 50 West 50th Street, New York 20, N.Y.

• 1928 •

Jim St. Louis has been promoted to the position of manager, Cuyahoga Lamp Works of the General Electric Company, Cleveland, Ohio. In his new position, Jim will have responsibility for the production of circline fluorescent lamps, sun lamps, mercury lamps, sodium lamps, and quartz stroboscopic lights for photographic needs. His address is 3485 Boynton Road, Cleveland Heights. George Mangurian is now

chief structural engineer for Northrup Aircraft, Inc., at Hawthorne, Calif. Prior to his present appointment, George was supervisor of structures projects at the Glenn L. Martin Company. He is living in Glendale, 22 miles from the Northrup plant, and says he is still having difficulty getting used to the Los Angeles traffic. George says his greatest concern is not with the technical problems of the job but with personnel questions, particularly recruiting good, young engineers.

Jim Greeley is now associate professor of mathematics and chairman of the Department of Mathematics at Utica College, Syracuse University. Carl Loeb and John Leslie are alumni members on the M.I.T. Corporation Visiting Committees for the Department of Metallurgy and the Department of Business and Engineering Administration, respectively. Ed Lockwood is vice-president of the Pacific Telephone and Telegraph Company and general manager for the Washington and Idaho area served by that organization. Ed is particularly delighted that his home is on the shore of Lake Washington.

Bill Thalheimer is manager of the Yerkes Rayon Plant, Buffalo, N.Y., of the Du Pont Company. Bill has been with Du Pont since 1928, when he started as a chemist at the Jackson Laboratory of the Organic Chemicals Department of Deepwater, N.J. Since then, he has had successive promotions in that department to production manager of fine chemicals, Wilmington, in 1948, and plant manager at New Brunswick.

Time magazine recently stated that Guillermo Zuloaga, as a member of the board of the Creole Petroleum Corporation (subsidiary of the Standard Oil of New Jersey), is the most important South American in the oil industry. Creole is the world's No. 2 oil producer. From 2,422 wells across Venezuela, they produce an average daily flow of 750,000 barrels of crude oil. One of Mr. Zuloaga's great accomplishments has been as geology and public relations representative on Creole's eight-man Management Committee. He played an important role in the evolution of the company policy which splits the profits 50-50 with the Venezuelan Government, employs qualified Venezuelans in preference to non-Venezuelans (all but 7 per cent of Creole's 14,500 employees are Venezuelans), insists that all other employees learn Spanish and that the company make a real contribution to housing, schools, hospitals, and cultural institutions.

Three '28 men are active in the J. O. Whitten Company, gelatin manufacturers in Winchester, Mass. They are: Bill Gorfinkle, Treasurer and General Manager, Jim Donovan, member of the board, and Ralph Joep, stockholder. Ed Hartshorne is manager of the Research and Development Department, Olin Cellophane Division, of the Olin Industries, Inc., New Haven, Conn. His previous assignment in the Olin organization was with two other subsidiaries, first as assistant director of research for the Western Cartridge Company and then as assistant director of research for the Winchester Repeating Arms Company. Jacob Berkover had one of the key roles in the development of the \$5,000,000 Sullivan Square traffic inter-

change project in Boston. This project is designed to break what was called the state's worst traffic bottleneck.

Here is a quick poll of the activities, family and otherwise, of several of our classmates: Newt Foster has a family of two boys and is in the Engineering Department of Congoleum-Nairn. Don Kennedy also has a two-boy family and he is with the Consolidated Edison Company, New York, in engineering. Al Dempe-wolf is advertising manager of the Celanese Corporation. Don Fraser's family consists of two boys and a girl and he is technical representative in the Foreign Market Department of the Gulf Oil Company at Pittsburgh. Montague Burgess has a family of two children and he is with the Bell Telephone Laboratories in New York City. Art Josephs is a partner in Zalk-Josephs Company, Duluth, Minn., and he has two children. Bill McClintic is with the General Cable Corporation doing sales engineering work. His report lists no family and, in that connection, he is joined by E. R. Stevens, who is vice-president of the Baldwin-Hill Company of Trenton, N.J. George Palo is the head structural engineer of TVA, Knoxville, Tenn. George reports that he is raring to play golf at the 25th reunion in 1953. Cliff Terry is with the Federal Telephone Company and has two young boys in his family. Henry Moggio is now president of Peter Moggio and Sons, silk manufacturers. Henry has two girls; Janice, 13, and Linda, six. Carl Loeb is vice-president of the Climax Molybdenum Company and chairman of the New York City Committee for the Armed Forces. His youngsters are Connie, 20, Carl, 17, and Peter, 15. Jim Donovan is head of the Artisan Metal Products Company in Waltham and has two boys in his family, aged seven and nine. Tom Wood is now sales manager in charge of lamp sales for the Corning Glass Works. His family consists of two boys, aged 14 and 18, and one girl, 16. — GEORGE I. CHATFIELD, General Secretary, 49 Eton Road, Larchmont, N.Y.

• 1931 •

The deadline for class notes in the March issue of The Review came almost on the day that my grades for the fall term were due and, as a result, the class notes became a casualty.

One of the interesting aspects of the Secretary's job is to note the unexpected sources of information, and I am happy to report that other classes read our notes. A letter arrived recently from George Murphy, '32. I. George is an old friend from high-school days and he reminded me that we would be celebrating our 25th high-school reunion this coming June. He mentioned several of our Class, including Eddie Abbot and Lou Evans, and he said the mention of Lou Evans in a previous issue prompted him to write. At present, George is resident engineer on the construction of the Elizabeth River Tunnel between Norfolk and Portsmouth, Va.

As a class our group may not be the best correspondents in the world, but they can use the telephone. Sheldon Smith and Hank Ahlberg called within hours of each other. Sheldon is with Sears Roebuck and Hank is back in Boston with Commercial

Filters. A recent news release from the Bell Telephone Laboratories announced that James B. Fisk has been appointed director of research, physical sciences. He has been their assistant director of research and director of physical research since 1939, except for the period from 1947-1949 when he was director of research for the Atomic Energy Commission and, simultaneously, Gordon McKay Professor of Applied Physics at Harvard. Another release announced that D. B. Sinclair, VI-A, has been chosen president of the Institute of Radio Engineers for 1952. At present he is chief engineer of the General Radio Company, Cambridge, and has been active in the development of radio-frequency measuring instruments.

Your President, Howard Richardson, will be in Cambridge tomorrow and we plan to discuss the reunion. Please send any suggestions, either for the reunion or the class notes, to your Secretary. — AUGUST L. HESSELSCHWERDT, JR., Secretary-Treasurer, Room 3-240, M.I.T., Cambridge 39, Mass.

• 1933 •

A memo from Ed Pierce announces that the home office of the Pierce Consulting Engineering Company will be located at 183 Essex Street, Boston, starting September 28, 1951. We learn through the *Brockton Enterprise* and *Times* that Leonard J. Julian has been promoted to the rank of lieutenant colonel. He is assigned to the 7845 Ordnance Maintenance Group at Esslingen, near Stuttgart, Germany. During the War he served for 25 months in the China-Burma-India theater, in which theater he was awarded the Bronze Star. Since his arrival in Europe, Colonel Julian and his family have traveled in Germany, England, Luxembourg, Holland, Belgium, and France.

Simeon I. Rosenthal was one of nine members of the Boston Naval Shipyard assigned for advanced study in naval architecture and marine engineering this past summer. An electronic engineer at the shipyard, he attended the courses as the shipyard inaugurated the most extensive phase thus far of its high-level training program. — We recently learned of the birth of a son to Mr. and Mrs. P. A. Coffin last February. Mr. Coffin is associated with the General Latex and Chemical Corporation of Gloucester. Ivan A. Getting has been made vice-president of Raytheon Company. An outstanding authority on radar, Dr. Getting for the past year has held the post of chief scientist of the United States Air Force. During World War II, he headed a laboratory which developed the famous SCR-584, an automatic radar control for anti-aircraft guns which is credited with saving London from the dread Nazi buzz bombs. Through Beau Whitten we learn that Bill Huston is now living on five acres overlooking a nice inlet from Chesapeake Bay, with chickens, fruit trees, garden, oysters, dock, fireplace, swimming, and all the trimmings — at Seaford, Va. W. W. Newton, is now vice-president in charge of the Geophysical Department of the Delhi Oil Corporation at Dallas, Texas. James P. Mills recently was appointed manager of product planning and control with Mo-

hawk Carpet Mills. — Charles C. Bell has been elected vice-president of Universal Winding Company, Cranston, R.I. Ferdinand M. Johnson is now associated with Pacific Mills at Rhodhiss, N.C. He has recently built a home in Hickory, N.C.

W. Cooper Cotton recently completed his new home, for which he drew the plans and supervised construction at Columbia, Mo. At present he is in the retail lumber business with his brother, D. Malcolm Fleming has recently moved to 98 Plymouth Road, Rockville Center, N.Y. The new second edition of Donald Fink's *Television Engineering* has recently been published by McGraw-Hill Book Company. It covers the basic theory and all latest developments in the design and operation of television systems. This complete revision discusses the operating principles of various systems (both black and white and color), describes the design and functions of all equipment (from the studio camera to the receiver viewing screen), and tells how to install and service all components. There are 120 pages on the subject of color TV alone; in fact, publication of the entire volume was delayed until the full details of the six latest systems could be included. A note from Cal Mohr tells us of the promotion of Robert E. Smith from development coordinator to production manager at the Rochester Division of the Pfaunder Company.

That's all for now. Please keep me posted on any news so that we can get something in these columns from time to time. — GEORGE HENNING, *General Secretary*, Belmont Smelting and Refining Works, Inc., 330 Belmont Avenue, Brooklyn 7, N.Y. ROBERT M. KIMBALL, *Assistant Secretary*, Room 24-105, M.I.T., Cambridge 39, Mass.

• 1935 •

In January of this year, Dave Terwilliger was promoted to the post of chief electromechanical engineer by Aircraft Armaments, Inc., Baltimore, Md. During World War II, Dave was a project engineer in the Servomechanisms Laboratory at the Institute. For several years thereafter, he worked for the Glenn L. Martin Company on fire-control systems. Fred O'Brien is a doctor practicing in Cohasset. After graduating in Biology and Public Health at the Institute, Fred earned his M.D. at Tufts, and took specialized training in eye work at the University of Iowa. As a lieutenant colonel in the Army Medical Corps, Fred commanded a portable hospital in the Pacific for two years. He and his wife now live in North Scituate and have four children. Jack and Helen Ballard's Christmas card announced the arrival of Miss Elizabeth H. Ballard on November 26. That makes two senior and three junior members of the Ballard family in Milwaukee. — J. BARTON CHAPMAN, *Secretary*, 7 Lalley Boulevard, Fairfield, Conn.

• 1936 •

These will probably be the shortest class notes on record. We are not getting much news. It is probably all my fault; if I wrote a few more letters, I might get

some answers. Better still, if I answered some of the letters I have already received more aggressively, we would get still more news. In the meanwhile, however, please accept our determination and promise that every ounce of news you fellows send in will be welcome and will be acknowledged promptly through this department of *The Review*.

These are busy days for all of us, but let's keep the class notes rolling. — ROBERT E. WORDEN, *Secretary-Treasurer*, Worden and Risberg, Fidelity-Philadelphia Trust Building, 123 South Broad Street, Philadelphia 9, Pa.

• 1937 •

J. S. Heal sent in the following report on the progress of the 15th reunion committee; the report, itself, was written by Rutherford Harris, Secretary of the committee: "The second meeting of the 15th reunion committee was held at the home of Bob Harris on January 30. Bob Thorson reported on his survey of suitable places for the reunion and recommended the Weekapaug Inn, Weekapaug, R.I. This hotel is located on the shore of the Atlantic, about seven miles from Westerly, R.I. The Class of 1936 held its 15th reunion there last year and enthusiastic reports were received from several men who attended that reunion concerning the service and facilities of the hotel. The inn quoted a price of \$38 per person for board and room for the full period of the reunion — Friday night to Monday morning. A guarantee of \$2,100 and a deposit of \$400 by March 1 was required by the management.

"Before making a final decision concerning the selection of the hotel, the committee considered other places which were available for this type of function. The list of hotels shown in the Class Reunion Manual was reviewed. The several hotels which have been well recommended by other classes or which were well known to the committee were all found to be unavailable. The committee then unanimously voted to make reservations at the Weekapaug Inn. Since the hotel selected required a substantial deposit in advance, the committee voted to request a registration fee from all persons planning to attend the reunion. The fee will be \$10 per person and will be applied toward the reunion cost; if the individual is unable to attend, the \$10 will be returned to him.

"The committee decided that there should be a second mailing to all on the class mailing list, on or about February 20th. It was planned to follow this with a third general mailing, which will include the class questionnaire; a fourth mailing, giving last-minute details will be sent only to those who are attending the reunion." — WINTHROP A. JOHNS, *Secretary*, 34 Mali Drive, North Plainfield, N.J. WALTER T. BLAKE, *Assistant Secretary*, White Sands Proving Ground, Las Cruces, N.M.

• 1938 •

We are glad to see that news of '38 is still coming in in good supply. From Ernie Neumann we learn that Karl Fransson is with Pratt and Whitney Aircraft Gas Tur-

bine Division. Bronald Vasalle is still in the Boston area and is giving some thought to starting his own company. Nick Wheelless is now vice-president of the Wheelless Drilling Company in Shreveport, La. Nick has one child and we understand that his picture appeared recently in *Drillers' Monthly*.

Cards to Don Severance include one from Frank Gardner who writes: "Eleanor and I have four boys: Dick, nine, Jim, seven, Dave, three, and Tom, nine months. We think Pittsfield is ideal for our family; we just go outdoors for practically all the winter and summer sports. Recently we have had here Fred and Isobel Reuter from Cleveland. Wish there were others. Am supervising metallurgist of the magnetics unit of the local General Electric transformer division laboratory." Dave Torrans writes: "This is a little late, but I seem to be busy both at Hercules Powder Company (Parlin Plant) where I am chief chemical engineer and at my home, Deer Run Farm, Middlebush, N.J., where we make a little milk. We finished killing pigs about two weeks ago. Made sausage and will smoke hams, shoulders, butts, and bacon as soon as they come out of the brine in two to three weeks. Chops and loins are in the freezer. I'm chief of the local volunteer fire department. Got a new fire district set up by the Township Committee last night so we will get a little tax money now if the voters don't object. Expect to grade up some new stone on my 1,200-foot front lawn with the tractor in the A.M. and maybe move a barn for the children's (two girls) pony in the P.M. if the plant doesn't call." From Tony Smith we hear: "Al is doing a fine job, but my contribution will not be startling. Married a Richmond girl (not rich); only way to be able to take out first papers; now almost a citizen. Two children: redheaded girl of five and one-half, and blond boy of two and one-half. We are brunettes — what's left of mine, that is. Am assistant supt. of construction for Stone and Webster, vice-president of my church (First Unitarian of Richmond), vice-president of Central Virginia Engineering Club — about 500 assorted engineers (you know — always a bridesmaid but never a bride). Am hoping soon to own more of my home than the mortgage company does, and so on. Snooped around Tech last summer. Very impressed. Wondered how I got through. Best of luck to you two!" And Bill Whitmore writes: "Still concerned with the operational aspects of the Navy's missile program; temporarily bowed down by the title of Scientific Analyst to A.C.N.O. for Guided Missiles. My predecessor in this job was Russ Coile. He has returned from Japan and promptly rushed off to Europe for an eight-month's assignment to the Staff of Sixth Fleet, O.E.G. (Operations Evaluation Group) continues to have a high proportion of M.I.T. men in it, as befits a D.I.C. project, but Russ and I are the only '38 men. John Everett of '37 is a deputy director of the group, also the recent father of a baby girl, Carol. Eddy Lamar '41, whom some will remember as a physics professor, just left the group for Naval Electronics Laboratory, San Diego." As might be expected, Don Severance does a bit of traveling and while on the *Cal-*

fornia *Zephyr* wrote: "At the M.I.T. Alumni Regional Conference held in Los Angeles on January 26, the following '38 men were present: Harold Strauss (in charge of publicity); Francis S. Buffington; William F. Burrall; Howard E. Britton; D. P. Severance. I spent Sunday with Howard and his family, largely seeing the sights of Los Angeles. Last night while in the San Francisco area, I spent the evening and was guest for dinner with Herb Wiley, his wife, and three daughters in Walnut Creek. Ran across Irving Smith, living in Santa Clara, Calif., working for Fiberglas. His two children were the best travelers on the *Zephyr*. When I dropped off at Denver, they had come 1,500 miles without a cheep, unlike the other youngsters aboard." From Given Brewer in Marion, Mass., comes the following letter: "For the past seven years I have been a consulting engineer specializing in electric strain-gauge analysis. Studies have ranged from rocket-blast pressures to rayon thread-winding tensions. Also certificated the first Canadian-built helicopter, the SGVI, and made a static and dynamic strain-gauge study of the blade stresses. Used a slip ring built by Dr. Ruge'33 and a network devised by him for the reduction of brush noise. Last fall I made three trips to a camp 400 miles north of Vancouver in British Columbia where the Aluminum Company of Canada is building the largest hydroelectric power plant in this hemisphere. At this site we buried a 10-foot diameter steel sphere inside the granite mountain with strain gauge attached to it for the determination of inflation strains. With all of the gauges attached, the sphere was tightly grouted into the rock and, after allowing the concrete to set, the testing began. We built up the pressure within the sphere hydraulically and measured the diametral strains in increments up to a final maximum of 3,600 pounds per square inch. The diametral expansion as measured by the gauges was checked by weighing the water input continuously. Knowing the sphere temperature and water temperature and weight, it is possible to calculate the weight of water absorbed by compression and the amount left over is that absorbed by sphere dilation. The strain-gauge dilation and the dilation by water agreed quite well. By knowing the relationship between sphere expansion and pressure, the rock modulus can be calculated and this value used for the design of the penstocks to run down through the rock. In this way the steel may be proportioned to have the rock carry the maximum possible component of the hydrostatic pressure. The test worked out to permit about an 80 per cent reduction in steel for several miles of penstocks. The [Boston] *Globe* recently carried an account of this latter test."

A brief news item notes that the Vocaline Company of America, Inc., manufacturers of electronics equipment, has undergone considerable expansion recently. John Cooney is chief engineer of the company and is living in Waldoboro, Conn. He was formerly with Sylvania and Submarine Signal. From Dave Wright, President of Lake Tankers Corporation, we have received some publicity describing a

twin screw Diesel towboat recently acquired by his company. Also in the news is Bruce Old of Arthur D. Little, Inc. The *Wall Street Journal* recently published an article describing the use of high top pressure for the operation of blast furnaces.

As well as being in the news, the Class of '38 is writing it. Recent authors are Bob Robbins and Bill Cook with an article in the *Boeing Magazine* entitled, "Flying the Forty-Seven." The Harvard Public Health *Alumni Bulletin* has published an article entitled, "Radioactivity — A New Factor in Public Health" by Gus Rossano. — ALBERT O. WILSON, JR., *General Secretary*, 24 Bennington Road, Lexington 73, Mass. *Assistant Secretaries*: DAVID E. ACKER, 210 Woburn Street, Lexington 73, Mass.; FREDERICK J. KOLB, JR., 211 Oak Ridge Drive, Rochester 12, N.Y.; RICHARD MUTHER, 116 West 67th Terrace, Kansas City, Mo.

• 1939 •

At this writing, Stu Paige, our General Secretary, is recuperating from a rather serious lung operation and the column is temporarily being handled by his assistants. The assistants join with the entire Class and wish Stu a complete recovery.

Sol Baker has been promoted to production manager of the Goodyear Division of the Rogers Corporation, producers of fiber and plastic materials. Sol, a Course X man, is living in Danielson, Conn., and has been with Rogers since graduation. Fred Cooke, reporting from Puerto Rico where he and Genie (nee Colclough) and the two daughters "weathered" the severe winter, is looking forward to a transfer to the Naval Proving Grounds at Dahlgren, Va. Fred has been in Puerto Rico long enough to appreciate "spacious quarters, inexpensive help, and abundant, cheap beverages." When he gets back to the United States, he will no doubt find cramped quarters, lack of expensive help, and lousy, expensive liquor.

Back in October, John A. West, Jr., IX-A, married the former Mrs. Alice Eddy Booth of Rochester, N.Y. The bride attended the Rochester Institute of Technology and the Parsons School of Design in New York. During World War II, she served with the American Red Cross in Italy, France, and Germany. Jack also had a tour of duty with the U.S. Navy and was separated as a lieutenant commander.

Bob Touzalin, a Course II man in the mighty important blast furnace business, has taken up H-O gauge model railroad-ing. As one of the country's 75,000 H-O modelers, he is casting side glances at the O-27 gaugers (Lionel, and so on) who are not working to true scale. The true O-gauge means that model engines and cars are $\frac{1}{4}$ inch to the foot. The H-O modelers work to half the O-gauge, or about three and one-half millimeters to the foot. As one of H-O group, Bob buys kits that are to be assembled and his road includes trestles, bridges, standard cars and engines, and the unusual cars that are found only in steel mills; as, for instance, cinder cars and submarines. Bob is with Arthur G. McKee Company and is living in Cleveland with his wife and two children (a boy, two, and a girl, three).

Hans Bebie heeded the January call for information regarding class members who have "been missed" in the last several years. He gave a splendid recap on West Coast classmates. Hans reported from Bellevue, Wash. where he is living with his bride of about 18 months. He left Glenn L. Martin Company in 1948 and transferred to the structures group of Boeing Airplane Company in Seattle. At Boeing, he was reunited with three more Course XVI men: John Alexander, Bob Withington, and Tex Diver'40. "John Alexander," writes Hans, "is one of Boeing's power plant and preliminary design experts, who has worked his way westward by way of Grumman, Wright Field, Stinson, Vultee, and finally to Boeing. He is married and father of one child. Bob Withington has been with Boeing for nine years and is now staff engineer in charge of power plants. On the side, he is past commodore of the Corinthian Yacht Club. Married; one child. Three Course XV men are in Seattle: Jim Barton is chief cost accountant for Boeing, secretary of the local alumni club, married, father of three, and building a new home. Ted Snow recently left Seattle to work in Boeing's Dayton office where he will handle liaison work with the Air Materiel Command. Ed Fish is running his own company and lives on his farm that lies near Issaquah, which is between Lake Sammamish and Snoqualmie Pass. Dick Loesch, IX-B, came to Boeing in 1946 and worked with the aerodynamics group before switching to flight test. At the moment he is project pilot for a special version of the B-47. Married; two sons. H. Merritt Woodward, XIII-C and fly-fisherman, is with American Mail Line Company. Married; three children. Charlie Lawrence, IV, is in partnership with George Hazen'40. They are doing fine in the Northwest's building boom. Charlie is the father of two boys, five and two."

Doc Wingard has indicated that he is thinking about arrangements for the 15th reunion to be held in '54. He recently stated that reservations must be made at least a year in advance and the time is drawing near for us to think about a suitable spot "somewhere near the center of gravity of the Class, which means New England." Doc hinted that it may be Oyster Harbor for the 15th. When Doc isn't busy managing the Ucinite plant in West Newton, he pitches in as chairman of the Community Fund, plays pappy to his three grown children, and gets away on quick business trips to Allentown, Pa., and Wright Field where he promotes some of his new products. At Wright Field it is understood that he contacts a Colonel Richard Sully Leghorn. — STUART PAIGE, *General Secretary*, 701 Mill Plain Road, Fairfield, Conn. *Assistant Secretaries*: GEORGE BEESLEY, Whitemore-Wright Company, Inc., 62 Alford Street, Charlestown 29, Mass.; MICHAEL V. HERASIMCHUK, Post Office Box 495, Bethlehem, Pa.

• 1940 •

The postman has been more than usually generous this past month with four letters from classmates as well as a lot of other news. Connie Schuerch writes: "Since 1940, I have spent two and one-

half to three years at M.I.T. on grad work, and defense research from 1940-1943. Two years (1943-1945) in the Air Force — 25 missions over Europe as navigator, usual fruit salad, and one silver bar. Eight months on defense research for the National Advisory Committee for Aeronautics lab in Cleveland. Year and a half to finish a doctorate at M.I.T. and two years on post doctorate work at McGill under Purves on lignin, 1947-1949. Married in Montreal to Margaret Childs Pratt, M.D., 1948. Teaching at New York State University, College of Forestry, Syracuse, N.Y., since 1949 and carrying on research almost exclusively on lignin at present. Two children: Barbara, two years eight months and Conrad, eight months."

From Johnny Burr, who has recently moved to 101 Oneida Lane, Oak Ridge, Tenn., comes the following: "After leaving school in 1940, I went to Du Pont, the Jackson Laboratory, then to the Azo area. In 1941, I went back to graduate school at Notre Dame. The following year I was offered and accepted an assistantship back at M.I.T., but my draft board got uppish and I wound up back with Du Pont at the smokeless powder plant near Louisville, then the Wabash Ordnance Works near Terre Haute. Tiring of analysis, I joined the metallurgical laboratory (Manhattan district later on) of the University of Chicago in January, 1943, and spent over a year at the Van de Graaff field station at Notre Dame. While there, I was married to Irma Garrigan (the wisest and happiest decision of my life). We now have five children; the oldest is a boy and the others are girls, including twins now four years old. This should certainly qualify me as the most prolific of our Class! Leaving the metallurgical laboratory in September, 1944, I went back to graduate school at Northwestern University. This rashness landed me promptly in the Navy, where I spent a year in school emerging bloody but unbowed as an ETM 3/C. This time I finished up the schooling, getting a Ph.D. in 1947 in organic chemistry (under Byron Riegel). Then followed an economically disastrous year as assistant professor at Miami University, Oxford, Ohio, from which we emerged both bloody and bowed. Since then I have been at the Oak Ridge National Laboratory as senior research chemist. We are very happily settled in Oak Ridge, a wonderful place to live. My work is concerned with organic reaction mechanisms, emphasizing the use of C-14 as a tracer. The work is unclassified; I have considerable freedom in initiating problems and complete freedom of publication (the lifeblood of any scientist!). Almost the only classmate I have seen since leaving is Wylie Kirkpatrick, and that was long ago in 1942 in Louisville. My wife and I visited Boston — my first visit since leaving — last spring when we attended the American Chemical Society's divided meeting there. However, we had time only for a brief visit to Technology, which included a pleasant talk with Professor Hamilton and an admiring gawp at the new library. Oddly enough, we found Boston to be a remarkably enjoyable city in sharp contrast to my old memories of the place. I should like to hear more news of our classmates,

particularly Phelps Walker, Bill Kather, and Wylie Kirkpatrick. I should also like to lay my hands on a bound volume of *The Tech* for 1940. I should appreciate your assistance in that endeavor."

Another very welcome letter came from Garry Wright, former Class Secretary and writer of this column. Garry enclosed \$2.50 covering the next five-year class dues. In addition he said: "My activity for this year, to date, has been the local chapter of the Missouri Society of Professional Engineers, of which I am serving as chairman for the year 1951. Many of our friends at the reunion last year may know that our little girl, Judy, came down with influenza meningitis a month after we returned from the reunion. They will be interested perhaps in knowing that she is completely recovered and shows no bad effect from that siege." That is indeed good news, Garry. Along with his letter, Garry also enclosed one from Mason Lindsey: "As Secretary of the M.I.T. Class of '40 you may be interested in the following information concerning myself. It may be my first instance of breaking into print but it's a good way to keep in touch with fellow Alumni. During the War I was a lieutenant on the *DE-147* and also spent a year in biological warfare research. Since getting out, I've been on the plant staff at Marcus Hook, American Viscose Corporation, as chief plant industrial engineer. Two years ago I married Betty Jane White of Wilmington and recently we obtained our home at 1080 West Avenue, Stoney Creek Park, Springfield, Pa."

I saw Seth Levine early in the morning on January 17. It was the first time we had met since graduation. The meeting place was the waiting room in the maternity ward of the George Washington University Hospital in Washington, D.C. Seth and his wife, Grace, are now the very proud parents of a daughter, Antonia Flax Levine, while Norma and I are the equally proud parents of a son, Eric Ward Gutttag. Seth is located in Washington as an economic consultant, mainly to the steamship industries. He has been doing this work for the past three years. Previous to that he was research consultant to the C.I.O. Maritime Committee. He is also editing *Tramp Shipping Quarterly* and writes frequently for *Shipping Survey*. The only other Technology men with whom he has come into contact recently are Suna Gershenson '43, who is in the building field and is the planner for a large housing development in Mexico, and Martin Ernst '41, who is a civilian physicist with the Navy.

Edward T. Cook and Elizabeth A. Blundon were married April 28, 1951, in St. John's Episcopal Church in Charleston, W. Va. They moved from Charleston to Orange, Texas, last July and Ed is now with Du Pont in Orange. Joe Paine has been promoted to chief project engineer in the Aircraft Armaments, Inc., organization. Joe joined the Glenn L. Martin Company immediately after graduating from M.I.T. and was, successively, head of the instrument development laboratory, head of the Fire Control Systems Analysis Unit, and supervisor of structural dynamics. He left Martin in 1950 to aid in the organization of the electromechanical department

at Aircraft Armaments. He is a member of the American Ordnance Association and the Institute of Aeronautical Sciences. Leonardo Zeevaert Wiechers, who received his master of science degree with us, is in the limelight as one of Mexico's prominent structural engineering specialists. He is consulting engineer on the Latino-Americana Building rising on Avenida Francisco I. Madero in Mexico City. Dr. Zeevaert Wiechers devised a floating foundation and pile combination for this building which will be 40 stories high and the tallest building in Latin America when it is complete.

John Hollomon has been named manager of the Metallurgy Research Department of the General Electric Research Laboratory in Schenectady, N.Y. After being on the Faculty at Technology and Harvard, John served in the U.S. Army from 1942 to 1946 where he attained the rank of major. While in the Army, he was chief of physical metallurgy at the Watertown Arsenal, Watertown, Mass. He received his doctor of science degree from Tech in 1946 and at that time joined the General Electric Research Laboratory. Later he was made assistant manager of the Metallurgy Research Department. John has authored and coauthored some 40 papers in physics and metallurgy journals, as well as a book, *Ferrous Metallurgical Design*. His professional awards include the Rossiter W. Raymond award of the American Institute of Mechanical Engineers in 1946, and the Alfred Noble award of the Combined Engineering Societies, 1947, for a paper entitled, "The Mechanical Equation of State." Recently he gave a talk before the Lynn section of the American Institute of Electrical Engineers on "The New Science of Metals." To continue to make this column full of news, don't forget to write to Al in '52. — ALVIN GUTTAG, *General Secretary*, 7114 Marion Lane, Bethesda 14, Md. MARSHALL D. MCCUEN, *Assistant Secretary*, Oldsmobile Division, General Motors Corporation, Lansing 21, Mich.

• 1941 •

We just received a note from the technical reports section of the National Bureau of Standards telling of some recent special development work on a new gamma survey instrument by a classmate, Saul Gilford, who is on the Bureau's staff. Saul, who with Sachio Saito developed this instrument, received his B.S. in Electrical Engineering from the Institute. Before going to the National Bureau of Standards he was employed at the Naval Ordnance Laboratory, doing electronic and electromechanical development work in connection with underwater ordnance and later acting as project engineer on development of electronic and electromechanical instrumentation in connection with the V.T. fuse program. At the National Bureau of Standards he has worked as an electrical engineer in medical electronics and is now employed as an electronic scientist. He is the author of several conference papers, including one on "Engineering Aspects of Biological Recorder Design" and one on "High Fidelity Electrocardiographs." He is a member of Eta Kappa Nu, the American Institute

of Electrical Engineers, and the Institute of Radio Engineers. Burnham Kelly recently gave a talk on "Dispersal and the Architect" to the Massachusetts chapter of the American Institute of Architects. Burnham also lectured to the Buffalo and Erie County Planning Association on "The Vital Need for a Realistic Housing Policy." More recently he has participated in the Ann Arbor conference on "Changing Community Patterns as a Result of Industrial Relocation." Wallace Howell is meanwhile holding his own as our foremost authority on rain making and has lectured recently to the Harvard Engineering Society on the experimental and engineering approaches to cloud seeding.

Bill Fader has been appointed general superintendent of the Christy Park Works of U.S. Steel's National Tube Company in McKeesport, Pa. Preston Gladding is basking in the publicity resulting from the *Deborah-June*, an oyster boat from West Tisbury which he helped to design. The boat is quite unique in that its hull is built around twin tubes which form either side of the boat, and to which are joined the stem and stern sections. The result is a boat of greater strength that provides increased safety at sea through better compartmentation and it is one that can be built at much lower cost than conventional steel craft. Howard McMahon has recently received the Edward Longstreth Medal for his work in inventing and developing a machine for liquefying helium. This unit has made liquid helium available to researchers who would not otherwise have been able to experiment at these low temperatures. We noticed an ad in *The Tech* the other day offering liquid helium at reasonable prices, so the news release must be true. McMahon worked with Professor Collins on the unit—which is known as the Collins Helium Cryostat. Jerome Namias and Walter G. Leight have written an article entitled "The Current Long-Range Forecasting Program of the U.S. Weather Bureau," page 21, January, 1952, issue of *Scientific Monthly*. Mr. Namias, who is chief of the extended forecast section, U.S. Weather Bureau, has been called one of the world's leading authorities on extended forecasting. George Burr, who is vice-president of the Instron Engineering Corporation, talked before the Quincy Rotarians the other day: subject, "Synthetics and the New Art of Testing." And on the marital front, Wilma Swissler has become Mrs. Herman Bartholomay. Congratulations.

And now we come to a bit of official-personal business; official to you, personal to your Secretary. May I for a moment emerge from the pronoun "we" and speak as an individual. As of the present issue of *The Review*, I am resigning as secretary-treasurer of the Class of 1941. I have planned to make this move for some time but have postponed action until after the 10th reunion. Needless to say, there was enough to do in setting up the reunion without complicating the program by my early resignation. As you know, our Class voted at reunion to continue Will Mott as its president. One of Will's first acts in his new term was to ask me to stay on as secretary. When Will was convinced that I wanted out, he appointed Ivor Collins as

secretary, with my hearty approval, for Ivor has been one of the most active members of our Class (outside of class officers) and has a most admirable news-gathering ability. In future columns then, you will be hearing from Collins instead of Backer. Please extend him the friendly support you have given me since 1941. As for my reasons for withdrawing at this time, I believe the job warrants new enthusiasm and ideas. Mine have rather dropped off in 10 years. I can recall when I never missed a column. A new man will bring a whole new section of the Class into prominence in his notes; his acquaintances at school were different both in course work and in extracurricular activities. Finally, the class secretary can best operate if located near Cambridge and there is considerable question as to my location starting in September, 1952. In withdrawing at this time I should like to express my appreciation to Will Mott for his support during the interval of 1941 to 1952, to Johan Andersen, our Assistant Secretary, for his help, and to Reid Weedon and his reunion committee for taking over the reunion planning so effectively. Finally, thanks to all who have supported the column by submitting news items and by keeping me posted via letters and cards. To the Alumni Office and the class notes editor—thanks for your friendly aid.—STANLEY BACKER, *General Secretary*, 335A Harvard Street, Cambridge, Mass. JOHAN M. ANDERSEN, *Assistant Secretary*, Saddle Hill Farm, Hopkinton, Mass.

• 1942 •

Many thanks to our Acting Secretary, George Kavanagh for the opportunity of using this column to report some news of classmates and, more particularly, for this chance of furthering the campaign for all-out attendance at our 10th reunion week end. I trust by now that you have all received our more formal notices giving details of the occasion, and we hope that you are all mailing in indications that you will attend with the Mrs. As a reminder, we will converge on the Hotel Griswold in New London, Conn., in time for lunch Saturday afternoon, June 7th. The program for Saturday includes athletic activities, cocktail party, banquet, and a few special surprises. There will be more of the same on Sunday, and on Sunday afternoon we will start the pilgrimage back to Boston in time for Alumni Day on Monday, June 9th. I, for one, am anxious to see what 10 long and hectic years have done to the old familiar faces, and I hope you also look forward to the reunion for a chance to reminisce with the rest of the '42 brown-baggers about "the good old days."

Remembering that the purpose of this column is to keep us abreast of the activities of our classmates, let's take a look at our reunion committee. At the outset, I must say that the committee is a most prolific and active group. Charlie Speas, assistant to the president of the Industrial Development Laboratories of Needham, is the chairman and treasurer of our committee. Since the birth of his second daughter, on November 17, Charlie has been operating with the sole purpose in life of giving to the Class the "mostest in

reunions for the leastest in money." By virtue of twins, recently arrived, Jack Loveland with three daughters is now one up on Charlie. Jack is in charge of sports and entertainment for the reunion, and, when not at committee meetings, feeding the twins, or enrolled in one of Esso's advanced training courses, is serving as head of operations analysis for the Esso Standard Oil Company in Everett. Milton Platt, director of research for the Fabric Research Laboratories in Boston, is chairman of the banquet committee. In charge of personal correspondence for the reunion, we have Al Dengler. Al is a development engineer for the American Oil Products Company in Somerville, Mass. Stan Golembe is handling post-reunion publications. Stan has recently been promoted to the impressive position of director of contract administration at the Laboratory for Electronics, here in Boston. Genial Lou from Vu Rosenblum is in charge of hotel arrangements and registration. Lou is still promoting photography, currently as assistant general manager of engineering at Polaroid. Yours truly is concerned with publicity for the reunion and is currently busy as a beaver at Doelcam Corporation in the capacity of vice-president for engineering.

As usual, the winter season around the Institute was high lighted by the mid-winter meeting of the Alumni Association which was held at Walker Memorial on January 31. The meeting saw the biggest turnout of local Alumni in Institute history—better than 750 people. At the '42 table we found Lieutenant Colonel Dick Gibson, whom the Air Force Institute of Technology is currently sending to M.I.T. for a two-year course of study. Dick, looking about 40 pounds heavier than when last seen by the writer, certainly appears to be one man who thrives on Air Force life. Frank McClintock, Assistant Professor in the Mechanical Engineering Department, as well as Frank Staszkesy of the Boston Edison Company, and Ragnvald Maartman-Moe of Raytheon were also present to uphold the honor of the Class. I caught a fleeting glance of Bill Nowak, but with all the crowd I couldn't get close enough to pass the time of day with him. I hope to do better at the reunion. I haven't seen our Class Prexy, Jerry Coe, since last November when this reunion business was teed off. He was looking hale and hearty at that time in spite of the pace he is keeping at General Electric in Schenectady, which doesn't allow for many trips back to Cambridge.

Charlie Speas would welcome any suggestions and comments for the reunion week end, and he also would like to remind you that class dues are \$1.00, payable to: Charles Speas, Acting Class Treasurer, 17 Crown Ridge Road, Wellesley 81, Mass. Many thanks to those who have already responded.—GEORGE J. SCHWARTZ, 371 Highland Street, Newtonville, Mass.

• 1943 •

Despite all the advance warning the Review editors give that class notes are soon due, I fail sometimes to prepare them in time. Last month was one of those months. Different it was, however, from

other due dates in that missing this one was inevitable; Linda, our second child, arrived on December 6, and came home on the 19th. The class notes were due on the 17th! Need I say more? Betty is now in good shape again, and Linda is progressing properly.

Other news from the Cincinnati area is provided by a long letter from Stewart Rowe who tells us that he is working for the Buckeye Cotton Oil Company, which is part of Procter and Gamble: "I started with the P. & G. Defense Corporation at the Wolf Creek Ordnance Plant after graduation and came up here at the end of the war. Buckeye is our southern subsidiary with cottonseed and soybean oil mills all over the Midsouth and Southeast, but our research and development work is primarily done here. I have charge of research and product service work on our isolated soybean protein which we sell to wallpaper coaters, box and converting mills, and a few book paper coaters and latex paint manufacturers.

"I am building a house on Congress Run Road in Wyoming, Ohio, which we expect to complete in late spring. We are expecting our first baby any day now; the scheduled date was December second." Stew's letter was written on the 10th! Stew is chairman of the Charter Subcommittee on Sewers in Cincinnati. Of this group, he tells us that the City Charter Committee "is our continuing 'reform party' whose existence has kept Cincinnati in the forefront of progress for the past 25 years. In order to keep from going stale, it has a number of citizens' committees working on various phases of municipal government problems. This committee on sewage and sanitation is one of them." His subcommittee, Stew told City Council recently, is working toward the development of a sound accounting basis for the city's proposed special charges to be levied against manufacturers and others dumping concentrated wastes into the city's disposal system. He said: "What Cincinnati does is apt to be a model for the whole Ohio Valley. It is important, therefore, that the operating policies and charges which Council is about to set up be sound and completely fair to all users, industrial and domestic alike." Then he indicated that under the proposed rules and regulations covering the disposal of wastes, users with serious sewage problems are required to pretreat the sewage before dumping it into the city's system. But the over-all object should not be to compel the construction of numerous private treatment plants in order to minimize the size or cost of the city's sewage works; it should be to minimize the total cost of sewage treatment to the community as a whole.

Dick Haas has also sent us news of his and his family's progress. As you will recall, the Haases had until recently been living in Monroe, La., and Dick is with the Kraftex Box Company. However, just before Christmas, he visited several corrugated box board plants in the New York and Chicago areas. Very recently he has been transferred to Kraftex' sales company, Kraftex Enterprises, Ltd., in Dallas where he will work his way through the operation as he has done through the

manufacturing plant at Monroe. He suspects that his program in Dallas will take a year or so.

Norman Gordon, who by profession is a city planner, recently delivered an illustrated talk before the Women's City Club in Cincinnati about certain areas in the city which are planned for redevelopment. At the present time, he is assistant city planner in the Queen City. He has "planned" for Montclair, N.J., and Cleveland, besides being a onetime adviser on postwar housing to the Chinese Nationalist Government. Another member of the Class to have recently spoken publicly is James O. McDonough. Jim's talk, delivered on December 20 to the Boston Section of the American Society of Mechanical Engineers, was on the subject, "Numerical Control of Machine Tools."

The former Gloria E. Hughes and James D. Ingham were married last November in Our Lady of the Immaculate Conception Church in Portsmouth, N.H. After their wedding trip into the White Mountains and Canada, the Inghams returned to Portsmouth to make their home. Incidentally, Portsmouth is Gloria's family home too. Jim is a consulting engineer. November was also the month for the wedding of Herbert Greenewald and Joan Kingsbury, whose home is in Taunton, Mass. Herb's bride is a Boston University graduate. This couple will live in Moorestown, N.J. On December 9, in the Beth El Synagogue in Brookline, Mass., Jacqueline Elaine Goldman and Richard M. Feingold were married. This couple, who went to Florida and Cuba for their honeymoon, are at home at 120 Independence Drive, Chestnut Hill, Mass. Dick's bride is a graduate of Smith College and has her master's degree from the Boston University School of Social Work. Dick, who went to Boston University Law School, is a member of the bar in Connecticut and Massachusetts. He is associated with the Gamewell Company in Newton Upper Falls, Mass. The engagement is announced of Marjorie Ruth Sisson of Brookline, Mass., to Seymour C. Kapstein. A January wedding was planned for this couple.

The Alfred Babcocks are now in Dobbs Ferry, N.Y.; they were formerly living in Stamford, Conn. Walt Boyd has left South Orange, N.J., and is now to be found in Woodstock, Vt. Gage H. Crocker is a major in the Air Force, stationed at the Wright-Patterson Air Force Base in Dayton, Ohio. John E. Guillothe has moved from Arlington, N.J., to Orange, Texas. Herbert M. Johnson, Jr., has changed his address from New London, Conn., to Springfield, Ill. Warren L. Knauer, who is with the National Gypsum Company, is now in Warren, Ohio; he was formerly in Des Plaines, Ill. David McKay has taken the sage old advice about going west and is in Hermosa Beach, Calif. Robert A. Miller went the other way — from Columbus, Ohio, to Mahwah, N.J. Walter A. Netsch, Jr., however, followed Dave west; he is in San Francisco, having moved there from Chicago. John Peterson has left Pocatello, Idaho, for Tarrytown, N.Y., and Sherm Sackheim, now lieutenant, is overseas with the 445th Ordnance Ammunition Company. Larry Stewart has

moved to Long Beach, Calif., and John Tinlot is in Rochester, N.Y. — CLINTON C. KEMP, *General Secretary*, 29 Verlynn Avenue, Hamilton, Ohio.

• 1948 •

Usually the clipping service provides one to two dozen engagements, marriages, and promotions which make good notes material. This month we received only three clippings. If this means that most of our Class is now married, and that we can count on the clipping service picking up only second, third, and fourth marriages and promotions which mention M.I.T., we shall have to depend on letters from all of you even more than we have in the past.

The one engagement we have to report this month is that of Donald Walsh to Nancy Foran. Don is living in East Park, N.Y., and his wife-to-be is from Forest Hills, Mass. She is an alumna of Boston Teachers College. The picture of Nancy that the clipping service sent shows that Don hasn't lost his eye for beauty. Two beautiful girls married M.I.T. men since we reported to you last. Orville Bean of West Newton, Mass., married Constance Austin of Providence, R.I. The couple will live at 35 Webster Street, West Newton. Constance is a Mt. Holyoke graduate and she also has a master's degree from the Yale University School of Public Health. The other marriage is that of Charles Dolan to Joan Vollmer in Greenwich, Conn. Charlie is serving in the Army at Fort Dix, and Joan is from Riverside, Conn. Charlie, who left Technology, graduated from Kenyon College, and Joan from St. Mary's School in Peekskill, N.Y.

Other news which has come our way over the last year includes the fact that R. E. Annis, Jr., is a mechanical engineer with the Hollingsworth and Whitney Paper Manufacturers in Waterville, Maine. Right after graduation in '48, he bought a 150-acre farm in Sidney, Maine, near Waterville. He reports: "With the passing of a laborious year and many pounds off my waistline, I was pleased to have been able to sell the farm and move to our present residence in the city." Any of us who are thinking of buying a big chunk of land with a farmhouse on it in order to become country squires had better write to "R. E." to get the real low-down on the life. His address is 71 Roosevelt Avenue, Waterville, Maine. Another bit of news comes from Carl A. Petersen, Jr., who reports that he is with Socony-Vacuum Oil Company in Brooklyn. His responsibilities include design and construction of pipe-line pump stations, terminals, and so on. Carl was not married at last report, spends his free time skiing and boating (just wait until he gets married), and he is living at 6802 Ridge Boulevard, Brooklyn, N.Y.

My previous paragraph remark about marriage is the fact that we have a new baby in our house and our present schedule doesn't leave Rosemary and me even time to think about skiing or boating, much less get out and do it. Candace Elizabeth Harris arrived on January 5, and, although she is the finest baby born in 1952, she doesn't do much for herself yet and we are as busy as the devil at a Sunday-school picnic.

That is about the end of the news for this month. Remember to write us a note if you want to tell all of your M.I.T. friends what you're doing without writing them individually. — WILLIAM R. ZIMMERMAN, *Secretary*, Kurt-Salmon Associates, 3000 Albermarle Street, Washington, D.C. RICHARD H. HARRIS, *Assistant Secretary*, Lovell Road, Holden, Mass.

• 1949 •

Jim Ryder was recently elected first vice-president of the Harvard Law School Forum, an extracurricular activity that sponsors the renowned panel discussions. Jim worked for A. D. Little upon graduation and entered the Law School in the fall of '50. Rusty Morris was discharged from the Army in January. For the past year Rusty was stationed at Redstone Arsenal, Huntsville, Ala., as a chemical engineer in the rocket and guided missile center. He plans to return to the National Tank Company, Tulsa. Ensign Charles Conlon won his Naval Wings upon completing the advance training in multi-engine aircraft at Corpus Christi, Texas.

What happened to the Class of '49; that's the mystery! Before the spring fever sets in, men, how about dropping your Secretary a note—a postcard will do—mentioning what you've done, are doing, or would do if. — CHARLES WILLETT HOLZWARTH, *Secretary*, 33 East Empire Street, San Jose, Calif.

• 1950 •

A letter from Nano Romaguera just arrived telling me of all the trials and tribulations of being a private in Uncle Sam's Army. Having been exposed to most of Nano's troubles myself, I can understand his dislike for sergeants. Nano is taking his basic training down in Camp Tortuguero, Puerto Rico. After his basic training, he intends to go to Officers' Candidate School and get his commission. Frank Fernandez '51 is down in Puerto Rico at the same camp undergoing a course in Army leadership. Both Frank and Nano send their hellos to all the Class from sunny Puerto Rico.

Warren Watters now has the title of ensign in front of his name. He gives his address as Coronado, Calif. First Lieutenant Charles Ablett has a nice assignment on the South Post, Fort Meyer, Va. Lieutenant Roy Hale was stationed down in Texas, but a change of address note shows that he and his wife are now in Fairborn, Ohio. A letter from Red Harris brings sad news about Jim Le Grazie. Jim had worked with Bill Harris and various other M.I.T. men on "Operation Greenhouse," the Atomic Energy Commission's Joint Task Force 3 program at Eniwetok, and in December he had been working for the Sandia Corporation in Albuquerque. Jim was found dead one morning in December due to gas poisoning from a defective heater in his apartment. That's all the details I have on Jim's tragic death but I am sure that I, along with the rest of Jim's friends, will miss a grand guy. Other Technology men who participated in "Operation Greenhouse" last year include George Reis, VIII, Friend Skinner, VI-A, Dick Holmberg, VI, Red Harris, VI, and

Vic Mayer, who graduated in 1947 and is now working on his Ph.D. in Physics at the Institute. Red Harris finishes off his letter by telling of the whereabouts of the gang today: "George Reis and Friend Skinner are now working for the Sandia Corporation. Jim McAllister, Joe Twombly, and myself are now working at the McDonnell Aircraft Corporation here in St. Louis, Mo. John Nicholson is working for Mallinckrodt Corporation. Bob Cesari left Harvard Law School after one year there and was called into the service as a second lieutenant. He is working at Frankford Arsenal in Philadelphia."

Paul Butler is working with Dennison's Foods out in Oakland, Calif. Ross Quincy is the assistant director of the Bangor, Maine, Chemical Engineering Practice School. Ed Cohen has the same title at the Buffalo Station of the C.E.P. Arthur Wolters is with the Du Pont Electro Chemical Plant at Niagara, N.Y. Jim Calkins is with Sunoco in Marcus Hook, Pa. Arnold Doyle, an R.O.T.C. man, was called into the Chemical Corps but his location hasn't been passed on to me yet. Warren Marcus was stationed as a lieutenant at Fort Leonard Wood, Mo., but was sent to Belvoir to the Engineer School. He's in the same class as Tom Keane and Al Petrofsky. By the way, Tom Keane just received his orders for the Far East. He'll be leaving at the end of March for sunny Korea.

On the brighter side of life, I've a few announcements of weddings and engagements. Jane Bullen Train was wed to John Robert Flynn on December 15, in Walter Reed Chapel, Army Medical Center. John is now with the Army and stationed in Washington where the couple will reside. Patricia Keshen was married to Lieutenant Joseph Freeman on December 22. Lieutenant Freeman is now on active duty at Fort Devens, Mass. Patricia Fraser and Dick Henderson tied the knot of matrimony on February 9. Joe O'Leary '51 was Dick's best man at a very nice wedding at Saint Nicholas of Tolentine Church in the Bronx, N.Y. Julie Margaret Post was engaged to Donald Bishop last December. Don is with the Singer Sewing Machine Company in Garden City, N.Y.

As for yours truly, Lieutenant J. T., I'm still at Belvoir going to school. Right now I'm in the Associate Engineer Company Officer Course, a prerequisite before overseas shipment. So after my completion of this present course late in May, I'll be expecting to be taking a nice boat ride, sometime in July or August. It's not too early to start thinking of Alumni Day. This year it's to be held on Monday, June 9th. The 27 of us that attended last year had a wonderful time. This year let's try to double that number of '50 men. Be seeing most of you at Alumni Day, June 9, 1952. — JOHN T. WEAVER, *Secretary*, 1772 East Tremont Avenue, Bronx 60, N.Y.

• 1951 •

Although Alumni Day at Technology is still two months away (June 9th), your Secretary wants to start beating the drums so that all of you fellows and gals will be able to make plans to get away from the usual routine and participate in the alumni day festivities. This will be the first annual

get-together — so let's make it a great one! A note to you married men: Give the missus (and children) a break and bring them along.

The number of '51 men who are still single is fast diminishing. Carl Benson became engaged to Ruth Dewnsnap. Carl is stationed at Fort Dix. Don DeMuzio and Grace Hulme announced their intentions. Dick Fidler and Katharine Edgar are making marriage plans. Dick was recalled to active duty by the Navy. As for marital news, Gordon Zucker married Phoebe Berman in Boston way back in November. Gordon is with the Army at Aberdeen, Md. Dick Brown spliced the knot with Sandra Lewis in March at Los Angeles, and Lou Dion, who is a quality control statistician with the Corning Glass Works in Kentucky, married Judith Pritzker at Lewiston, Maine, on Christmas Day. Congratulations to all of you!

The response from the numerous post cards sent out by your Secretary has been most encouraging. Thanks are hereby extended to those of you who took time to answer the card or to write a letter. Now, since it will take me quite a long time to cover the entire Class, I want to encourage you to jot down a few notes about your activities and send them to me for inclusion in the class notes. My appeal is especially directed to the boys in the service who should have some time available to send a card. How about it, fellows? A card from Jerry Lyons informs us that his ship is still at Pearl Harbor. Mark Franklin is now in the Navy undergoing preliminary training while waiting to be called to Officers' Candidate School. Mark worked as an industrial engineer with Lockheed before joining his new employer. He writes: "This boot training is quite the life — up at 3:35 A.M. and to bed at 9:00 P.M. — I am accustomed to such hours when they are reversed!" Dick Greenwalt, who is at the University of Iowa while working toward his doctor's degree, said he met Vern Pfanku recently. Vern was on his way to Korea for duty as an air installations officer. Good luck, Vern!

Jim Hart reported that he is doing radar development work for Motorola, Inc., at Chicago and utilizes his spare time to pitch in for civilian defense work and radio work. Jim also gives us some news about Tom Lockerbie. Tom worked for Socony-Vacuum in New Jersey until he was called to active duty by the Army. Also, Tom got married way back in September to Barbara Bloomfield of New York City. A letter from Fred Lehmann informs us that he is attending Air Force school at the Lowry Air Force Base in Colorado. Fred said his hours are a bit different from those at Technology. Classes run from 6:00 A.M. to noon. And we thought those 9:00 A.M. classes were a bit early! By the way, Fred ran into Howie Livingston who is now doing graduate work at Iowa State. Ken Peterson is stationed at the MacDill Air Field, Tampa, Fla., where he is doing weather forecasting. Fred Bumpus reported for a new assignment at Fort Devens after completing quartermaster school at Ft. Lee, Va.

Morley Drucker is doing graduate work at the University of Minnesota. He writes

that the liberal arts background of the school helps to balance off the technical aspects of his graduate work. Mike Lecar wrote in to say that his time is divided between teaching and working for his master's degree in industrial engineering. Mike met John Scalzi who is now also teaching at the Case Institute of Technology. Mike reported that Bob Greaney is working at the Parker Appliance Company at Cleveland. Hugh Knipmeyer reports that the class notes announcement of his marriage was a bit premature—his marriage is scheduled to take place this June. Apologies are in order. Hugh stated that Harry Johnson and Gus Hendrickson are helping him to represent '51 at the chemistry graduate school of the University of Illinois. Barry Norris is working as chief of the inspection section of Air Installations at the Edwards Air Force Base in California. Barry also announced his engagement to Barbara Adams and said they expect to get married in June.

Dave Janis reports that he is doing estimating work at the White Plains Iron Works in Peekskill, N.Y. Prior to this

work, Dave was doing stress analysis, structural design, and testing work at Raytheon. Keith Koehler writes: "My wife Ruth and I are enjoying southern California despite the Florida weather. I am working as a research engineer at Cal Tech's Jet Propulsion Lab. The local M.I.T. club had a conference in January at which we saw several of the Faculty members and Dr. Killian—also a few lively demonstrations, enough to convince all that M.I.T. is still tops."

Joe Doherty informs us that he is working as a project engineer for the Birdseye division of General Foods and is doing plant development engineering work in connection with the fisheries operation. Aaron Brody is also with Birdseye. Joe goes on to say that he met Em Marchetti, who is stationed at Fort McClellan with the Chemical Corps, and Fred Radcliffe and his wife. Fred is in the Bigelow-Sanford training program. Maurice Hedaya writes: "I'm in the Planning and Operations Control Department at the Glenn L. Martin Company in Baltimore. I'm in a budgetary control group which

means that we control expenditures. For the first time in a few years I am controlling expenditures and am not raising funds." In his spare time, Maurice is attending Johns Hopkins University. Howie Schwartzman reported that he is on a General Electric program for chemical engineers with three-month rotating assignments. Last summer Howie did industrial engineering work and followed that assignment with development work in the research lab. At present, he is doing engineering and liaison work in connection with a five-million-dollar expansion program of G.E.'s silicon plant. Howie stated that he met Dick Mathews '50 and Sid Brenner. Dick is in the Aircraft Engineering Laboratory while Sid is occupied in the Research Laboratory.

In signing off, may I remind you once more to keep Alumni Day in mind when you make plans for June? Remember this is your column—sooo—how about taking a few minutes and writing a note or letter of your activities. — STANLEY J. MARCEWICZ, Secretary, Morris D-34, Harvard Business School, Soldiers Field, Boston 63, Mass.

ALUMNI DAY AT M.I.T.

Monday, June 9, 1952

- ★ Luncheon in Du Pont Court
- ★ Departmental Reunions and Forums
- ★ President Killian's Open-House Reception
- ★ The Alumni Banquet at the Statler in Boston
- ★ A New Souvenir Stein to Add to Your Collection

What GENERAL ELECTRIC People Are Saying

H. H. WATSON

Construction Materials Division

HIGHER VOLTAGE BRANCH CIRCUITS FOR COMMERCIAL BUILDING LIGHTING: The ever-increasing trend toward higher levels of illumination in office buildings has for some time invited the use of higher voltage branch circuits. But it was not until the remote control wiring system was introduced that higher voltage branch circuits became practicable here. The Underwriters' Laboratories, Inc., standard for snap switches recognizes two voltage classifications: 0 to 250, and 250 to 600. Snap switches made to the 600-volt rating are much too large and costly to be used for the control of individual office lighting. The remote control system uses an electro-magnetic relay for switching which is built to the Underwriters' Laboratories, Inc., 0-300-volt specifications for magnetic switches. It is, therefore, properly rated for use in the 277-volt circuits of a 480Y/277-volt branch circuit system. With this new switching means available, the problem of a switch is solved. Not only is the problem solved, but the resulting system has the added safety factor of 24-volt control circuits.

Western New England Chapter

I.A.E.I.

December 5, 1951



A. D. MARSHALL

Corporate Affairs Department

SOCIAL SECURITY—A PROBLEM FOR AMERICAN BUSINESS: A recent report by the Chamber of Commerce of the United States estimates that 300 welfare plans take a third of all government tax dollars.—\$22, 800,000,000 during the fiscal year of 1949-50—or \$575 for every tax-paying family.

Over the years the leaders of our business enterprises have solved many problems through their own individual initiative. They have made more products available at

less cost to the American worker than any nation in the history of the world. But we are now confronted with the fundamental problem of whether American business can face and solve, through the initiative of its managers and businessmen, the problems involved in social security, or whether these are to be taken over by bureaucratic government control and resolved in a way which will lead us directly from social security into socialism. There appears to be little doubt that when a government takes over the savings of all the people for the emergencies of life—sickness, death of the breadwinner, unemployment, old age, and the many other things which the social planners include in the so-called social security program—and directs to whom and under what circumstances that money shall be paid, the government which does that must soon take the responsibility of directing the lives and actions of all of us.

Many social planners and government bureaucrats see in the desire for individual security an opportunity for more and more government control. This may be one form of security, but most of you people will agree with me that real security lies in the productive success of the enterprise with which we as individuals are connected.

We should not let the battle go to the social planners by default. We must spend time and effort in analyzing and presenting the necessary facts to our legislators with respect to these problems and, more than that, we must present the solutions which will not only meet the problem, but will also serve to fit into our concept of the free enterprise system.

Annual Meeting,

Framingham Chamber of Commerce

January 15, 1952

E. D. TROUT

X-Ray Department

COBALT-60 IRRADIATOR FOR TELETHERAPY: In 1951, a Cobalt-60 unit was constructed by General Electric to the basic design of L. G. Grimmett, Ph.D, Head of the Department of Physics of the M. D. Anderson Hospital for Cancer Research at Houston, Texas.

The Cobalt-60 irradiator has now been installed at the Oak Ridge Institute of Nuclear Studies and it has been loaded with a 200 curie source loaned by Dr. Max Cutler of the Chicago Tumor Institute. A preliminary report on the irradiator was presented before the Radiological Society of North America at its recent annual meeting. Further studies of the shielding about the source, beam characteristics, and depth dose are underway, as are biological studies. When these are completed the irradiator will be reloaded with a 1000 curie (effective) source from the Chalk River pile and transferred to the M. D. Anderson Hospital for use in the treatment of cancer.

The 1000 curie source should deliver approximately 90 roentgens per minute at the end of the 50 cm. treatment cones. An x-ray generator operating at 1 mv. and 3 ma. produces 150 roentgens per minute, and a 2mv. x-ray unit operating at 1.5 ma. delivers 600 roentgens at this distance. The Cobalt-60 beam, being nearly monochromatic at 1.2 mev, should be more nearly comparable to the 2 mv. x-ray unit in the matter of depth dose.

Until such time as Cobalt-60 becomes available at a much lower cost, or until some other artificial source becomes available, the super-voltage x-ray machine will not be supplanted by artificial radioactive substances.

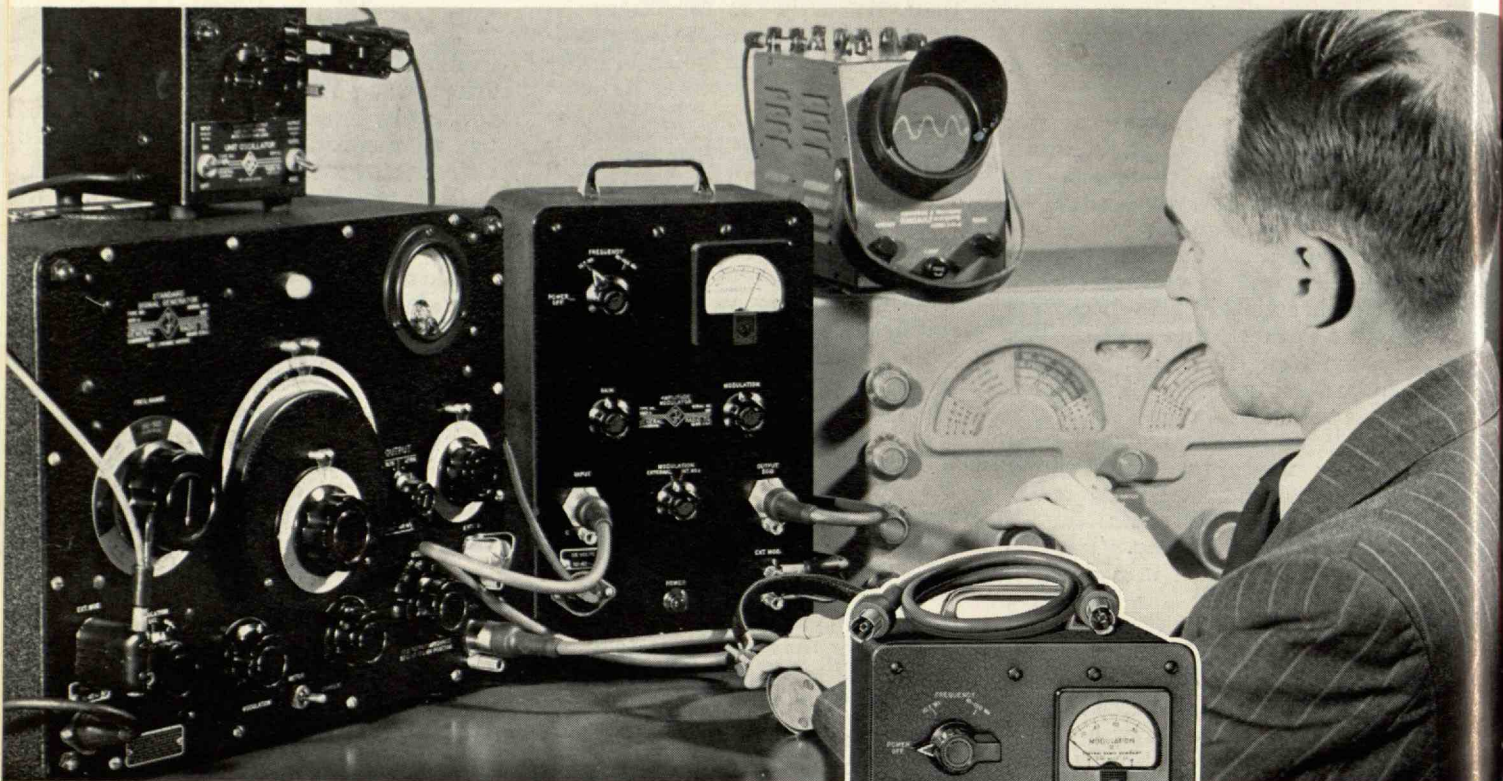
AIEE, New York City

January 7-8, 1952

You can put your confidence in—

GENERAL  ELECTRIC

Here's a Simple Way to — Eliminate Incidental FM from A-M Measurements on HF and UHF Equipment



Carrier Range: 5 to 220 Mc

Modulation Frequency: 20 to 15,000 Cycles

The **GR Type 1023-A Amplitude Modulator** provides an a-m signal with no significant fm, from all standard-signal generators. All simple standard-signal generators, even those with a modulated amplifier following the oscillator, provide some incidental fm when amplitude modulation is used. This effect is particularly prevalent above 30 Mc. The presence of incidental fm can produce completely false results in measurements of both selectivity and sensitivity.

With many a-m signal generators incidental fm may be as high as 20 kc at 50 Mc with 80 to 100% modulation. Use of the G-R Type 1023-A Amplitude Modulator will result in an improvement of as much as 1000 to 1.

This instrument is particularly useful in checking the performance of such apparatus as voice ground-to-air communication equipment; air navigation Omnitrange and ILS; telemetering and remote control equipment using am.

It provides a means of adding am, without incidental fm, to f-m signal generators so that simultaneous measurements of a-m rejection and f-m response can be made on equipment used in such services, as fm, tv, telemetering and remote control.

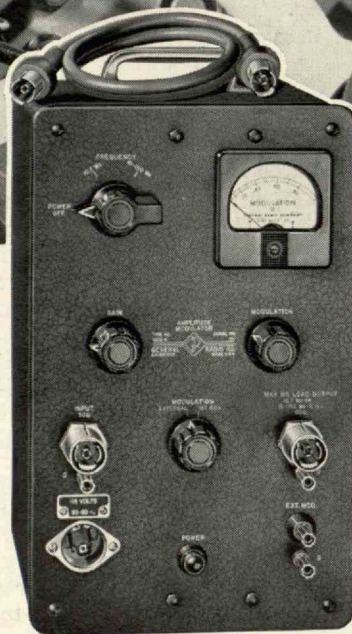
It also makes an unmodulated test oscillator into a modulated signal source, free from fm.

Oscilloscope Traces

Audio output of receiver (without crystal or other band rejection circuit) when normal incidental fm is present in signal source. Carrier frequency 50 Mc; modulating frequency 400 cycles.



Audio output of same receiver with same signal generator when a Type 1023-A Amplitude Modulator is used to avoid any incidental fm. Same carrier and modulating frequency.



Type 1023-A
Amplitude Modulator
\$250

One of its important features is a second range of 10.1 to 11.3 Mc. At 10.7 Mc (the RMTA standard f-m receiver intermediate frequency) this range provides a gain of 10 with a band width to the half-power points of ± 0.6 Mc, gain and modulation percentage being substantially independent of input voltage at levels up to 0.1 volt. Output voltages up to 3 volts can be obtained without serious increase in envelope distortion, with some change in gain.

Modulation up to 80% is provided, either internal at power-line frequency or external from 20 to 15,000 cycles. Envelope distortion is less than 5% at 80% modulation. From 1 microvolt to 1.5 volts, gain and modulation percentage are practically independent of r-f input voltage.



GENERAL RADIO Company

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